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Ministry of Agriculture &
Farmers Welfare

Report of the Committee on Doubling Farmers' Income

Volume IV

"Post-production interventions: Agricultural Marketing"

Capturing Value from every Grain, every Ounce, every Drop of agricultural produce

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Document prepared by the Committee on Doubling Farmers' Income,
Department of Agriculture, Cooperation and Farmers' Welfare,
Ministry of Agriculture & Farmers' Welfare.

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Foreword

The country has witnessed a series of concerted discussions dealing with the subject of agriculture. In 1926, the Royal Commission of Agriculture was set up to examine and report the status of India's agricultural and rural economy. The Commission made comprehensive recommendations, in its report submitted in 1928, for the improvement of agrarian economy as the basis for the welfare and prosperity of India's rural population. The urban population was about 11 per cent of the whole, and demand from towns was small in comparison. The Commission notes, that communication and physical connectivity were sparse and most villages functioned as self-contained units. The Commission encompassed review of agriculture in areas which are now part of Pakistan, Bangladesh and Myanmar. The net sown area in erstwhile British India was reported as 91.85 million hectares and cattle including buffaloes numbered 151 million. Almost 75 per cent of the cultivated area was under cereals and pulses, with rice and wheat occupying 46 per cent of the net sown area. The area under fruits and vegetables was about 2.5 per cent and that under oilseeds and non-food crops was about 20 per cent. In the ensuing years, as well known, the country underwent vast changes in its political, economic and social spheres.

Almost 40 years later, free India appointed the National Commission on Agriculture in 1970, to review the progress of agriculture in the country and make recommendations for its improvement and modernisation. This Commission released its final report in 1976. It refers to agriculture as a comprehensive term, which includes crop production together with land and water management, animal husbandry, fishery and forestry. Agriculture, in 1970 provided employment to nearly 70 per cent of the working population. The role of agriculture in the country's economic development and the principle of growth with social justice, were core to the discussions. The country was then facing a high population growth rate. After impressive increase in agricultural production in the first two Five Year Plans, a period of stagnancy set in and the country suffered a food crisis in the mid-1960s. The report in fifteen parts, suggested ample focus on increased application of science and technology to enhance production.

Thirty years hence, the National Commission for Farmers was constituted in 2004 to suggest methods for faster and more inclusive growth for farmers. The Commission made comprehensive recommendations covering land reforms, soil testing, augmenting water availability, agriculture productivity, credit and insurance, food security and farmers competitiveness. In its final report of October 2006, the Commission noted upon ten major goals which included a minimum net income to farmers, mainstreaming the human and gender dimension, attention to sustainable livelihoods, fostering youth participation in farming and post-harvest activities, and brought focus on livelihood security of farmers. The need for a single market in India to promote farmer-friendly home markets was also emphasised.

The now constituted DFI (Doubling Farmers' Income) Committee besides all these broad sectoral aspects, invites farmers' income into the core of its deliberations and incorporates it as the fulcrum of its strategy. Agriculture in India today is described by a net sown area of 141 million hectares, with field crops continuing to dominate, as exemplified by 55 per cent of the area under cereals. However, agriculture has been diversifying over the decades. Horticulture now accounts for 16 per cent of net sown area. The nation's livestock population counts at more than 512 million. However, economic indicators do not show equitable and egalitarian growth in income of the farmers. The human factor behind agriculture, the farmers, remain in

frequent distress, despite higher productivity and production. The demand for income growth from farming activity, has also translated into demand for government to procure and provide suitable returns. In a reorientation of the approach, this Committee suggests self-sustainable models empowered with improved market linkage as the basis for income growth of farmers.

India today is not only self-sufficient in respect of demand for food, but is also a net exporter of agri-products occupying seventh position globally. It is one of the top producers of cereals (wheat & rice), pulses, fruits, vegetables, milk, meat and marine fish. However, there remain some chinks in the production armoury, when evaluated against nutritional security that is so important from the perspective of harvesting the demographic dividend of the country. The country faces deficit of pulses & oilseeds. The availability of fruits & vegetables and milk & meat & fish has increased, thanks to production gains over the decades, but affordability to a vast majority, including large number of farmers too, remains a question mark.

The impressive agricultural growth and gains since 1947 stand as a tribute to the farmers' resilience to multiple challenges and to their grit & determination to serve and secure the nation's demand for food and raw material for its agro-industries.

It is an irony, that the very same farmer is now caught in the vortex of more serious challenges. The average income of an agricultural household during July 2012 to June 2013 was as low as Rs.6,426, as against its average monthly consumption expenditure of Rs.6,223. As many as 22.50 per cent of the farmers live below official poverty line. Large tracts of arable land have turned problem soils, becoming acidic, alkaline & saline physico-chemically. Another primary factor of production, namely, water is also under stress. Climate change is beginning to challenge the farmer's ability to adopt coping and adaptation measures that are warranted. Technology fatigue is manifesting in the form of yield plateaus. India's yield averages for most crops at global level do not compare favourably. The costs of cultivation are rising. The magnitude of food loss and food waste is alarming. The markets do not assure the farmer of remunerative returns on his produce. In short, sustainability of agricultural growth faces serious doubt, and agrarian challenge even in the midst of surpluses has emerged as a core concern.

Farmers own land. Land is a powerful asset. And, that such an asset owing class of citizens has remained poor is a paradox. They face the twin vulnerabilities of risks & uncertainties of production environment and unpredictability of market forces. Low and fluctuating incomes are a natural corollary of a farmer under such debilitating circumstances. While cultivation is boundarised by the land, market need not have such bounds.

Agriculture is the largest enterprise in the country. An enterprise can survive only if it can grow consistently. And, growth is incumbent upon savings & investment, both of which are a function of positive net returns from the enterprise. The net returns determine the level of income of an entrepreneur, farmer in this case.

This explains the rationale behind adopting income enhancement approach to farmers' welfare. It is hoped, that the answer to agrarian challenges and realization of the aim of farmers' welfare lies in higher and steady incomes. It is in this context, that the Hon'ble Prime Minister shared the vision of doubling farmers' income with the nation at his Bareilly address on 28th February, 2016. Further, recognizing the urgent need for a quick and time-bound transformation of the

vision into reality, a time frame of six years (2016-17 to 2022-23) was delineated as the period for implementation of a new strategy.

At the basic level, agriculture when defined as an enterprise comprises two segments – production and post-production. The success of production as of now amounts to half success, and is therefore not sustainable. Recent agitations of farmers (June-July 2017) in certain parts of the country demanding higher prices on their produce following record output or scenes of farmers dumping tractor loads of tomatoes & onions onto the roads or emptying canisters of milk into drains exemplify neglect of other half segment of agriculture.

No nation can afford to compromise with its farming and farmers. And much less India, wherein the absolute number of households engaged in agriculture in 2011 (119 million) outpaced those in 1951 (70 million).Then, there are the landless agricultural labour who numbered 144.30 million in 2011 as against 27.30 million in 1951. The welfare of this elephantine size of India's population is predicated upon a robust agricultural growth strategy, that is guided by an income enhancement approach.

This Committee on Doubling Farmers' Income (DFI) draws its official members from various Ministries / Departments of Government of India, representing the panoply of the complexities that impact the agricultural system. Members drawn from the civil society with interest in agriculture and concern for the farmers were appointed by the Government as non-official members. The DFI Committee has co-opted more than 100 resource persons from across the country to help it in drafting the Report. These members hail from the world of research, academics, non-government organizations, farmers' organizations, professional associations, trade, industry, commerce, consultancy bodies, policy makers at central & state levels and many more of various domain strengths. Such a vast canvas as expected has brought in a kaleidoscope of knowledge, information, wisdom, experience, analysis and unconventionality to the treatment of the subject. The Committee over the last more than a year since its constitution vide Government O.M. No. 15-3/2016-FW dated 13th April, 2016 has held countless number of internal meetings, multiple stakeholder meetings, several conferences & workshops across the country and benefitted from many such deliberations organized by others, as also field visits. The call of the Hon'ble Prime Minister to double farmers' income has generated so much of positive buzz around the subject, that no day goes without someone calling on to make a presentation and share views on income doubling strategy. The Committee has been, therefore, lucky to be fed pro-bono service and advice. To help collage, analyse and interpret such a cornucopia of inputs, the Committee has adopted three institutes, namely, NIAP, NCAER and NCCD. The Committee recognizes the services of all these individuals, institutions & organisations and places on record their service.

Following the declaration of his vision, the Hon'ble Prime Minister also shaped it by articulating 'Seven Point Agenda', and these have offered the much needed hand holding to the DFI Committee.

The Committee has adopted a basic equation of Economics to draw up its strategy, which says that net return is a function of gross return minus the cost of production. This throws up three (3) variables, namely, productivity gains, reduction in cost of cultivation and remunerative price, on which the Committee has worked its strategy. In doing so, it has drawn lessons from the past and been influenced by the challenges of the present & the future.

In consequence, the strategy platform is built by the following four (4) concerns:

- Sustainability of production
- Monetisation of farmers' produce
- Re-strengthening of extension services
- Recognizing agriculture as an enterprise and enabling it to operate as such, by addressing various structural weaknesses.

Notwithstanding the many faces of challenges, India's agriculture has demonstrated remarkable progress. It has been principally a contribution of the biological scientists, supplemented by an incentivizing policy framework. This Committee recognizes their valuable service in the cause of the farmers. It is now time, and brooks no further delay, for the new breed of researchers & policy makers with expertise in post-production technology, organization and management to take over the baton from the biological scientists, and let the pressure off them. This will free the resources, as also time for the biological scientists to focus on new science and technology, that will shift production onto a higher trajectory - one that is defined by benchmark productivities & sustainability. However, henceforth both production & marketing shall march together hand in hand, unlike in the past when their role was thought to be sequential.

This Report is structured through 14 volumes and the layout, as the readers will appreciate, is a break from the past. It prioritizes post-production interventions inclusive of agri-logistics (Vol. III) and agricultural marketing (Vol-IV), as also sustainability issues (Vol-V & VI) over production strategy (Vol. VIII).The readers will, for sure value the layout format as they study the Report with keenness and diligence. And all other volumes including the one on Extension and ICT (Vol. XI), that connect the source and sink of technology and knowledge have been positioned along a particular logic.

The Committee benefited immensely from the DFI Strategy Report of NITI Aayog. Prof. Ramesh Chand identified seven sources of growth and estimated the desired rates of growth to achieve the target by 2022-23. The DFI Committee has relied upon these recommendations in its Report.

There is so much to explain, that not even the license of prose can capture adequately, all that needs to be said about the complexity & challenges of agriculture and the nuances of an appropriate strategy for realizing the vision of doubling farmers' income by the year of India's 75th Independence Day celebrations.

The Committee remains grateful to the Government for trusting it with such an onerous responsibility. The Committee has been working as per the sound advice and counsel of the Hon'ble Minister for Agriculture and Farmers' Welfare, Shri Radha Mohan Singh and Dr. S.K. Pattanayak, IAS, Secretary of the Department of Agriculture, Cooperation and Farmers' Welfare. It also hopes, that the Report will serve the purpose for which it was constituted.

12th August, 2017

Ashok Dalwai
Chairman, Committee on
Doubling Farmers' Income

About Volume IV

The fourth volume of the Report of the Committee on Doubling Farmers' Income (DFI) examines the status and reforms needed in the agricultural marketing system. A clear differentiation is proposed between the system that facilitates marketing of agricultural produce and the modes to connect the produce to markets. The latter is a physical function, and is discussed in the first part of this volume. The former is the environment and the logic behind that function, to guide and enable the ways that agricultural produce can realise optimal value.

The volume discusses the market network and system, which was earlier designed to address a state of subsistence farming that existed prior to the period of about two decades. The distress to farmers arises from production not finding markets. In appreciation of this issue as a priority concern, a state of surpluses which causes an inverse relation between production and value is discussed. Emphasis is given to enabling an environment that opens up to a larger number of stakeholders to drive competition. The mere availability of market yards is not sufficient, and to be effective, they must also serve to channel the produce of farmers and manage transactions at other locations.

Considering the changing consumption patterns, this volume discusses the need for the system to have a market-led approach and stimulate demand-driven production. This volume informs of the requisite to provide demand based analytics. While price signals are important, they are mainly ex-post facto signals, and the marketing system needs to also monitor demand. Demand forecasts, will lead to planned production and a directed flow of produce. However, a cautious policy is suggested before its full roll out can happen. Marketing as a support activity, should enable farmers by contributing value added inputs, on what to produce, where to send their harvest, and to administer their input and output costs accordingly. Such inputs will progress the agriculture sector from a push mode into markets, towards servicing a pull from consumers. The role of marketing is to be the key enabler to take agriculture sector beyond the function of cultivation only, into the arena of business. This volume discusses various reforms to transition the agricultural marketing system and also suggests the roadmap for a truly unified 'National Agricultural Market' that is not only efficient but also effective, particularly for the small & marginal farmers.

The following fifth & sixth volumes of this Report, discuss the sustainability concerns and framework of agriculture, as it is critical to ensuring consistent and continued growth.

Ashok Dalwai

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Doubling Farmers' Income

Volume IV

"Post-production interventions: Agricultural Marketing"

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Chapter 1
Why Marketing?

All produce - every grain; every ounce; every drop - from agriculture sector must find gainful end-use. Demand-driven production of agricultural produce, rather than production-propelled marketing, is the need of the day now. India is one of the largest markets for agricultural produce and markets need to function as a unified platform to make all consumers accessible to all the farmers in the country.

1.1. Introduction

There are often overlaps and ambiguities in the expectations from agricultural marketing and its outcomes, both as a system of governance and as a function of business. India has seen a transition in agricultural marketing, from the period of subsistence farming, to one which is developing into a surplus food economy. The scope of agricultural marketing, its role in monetisation of agriculture produce and the creation of value from delivering relevant flow of market information, for farmers to be demand linked in all their farming and post-production activities are discussed in the volume.

Agricultural marketing as a term, is used to refer to different facets, as an academic study, as a function of the supply chain, as well the marketing regulations and associated policy. In actual application, the core function of providing market intelligence is frequently overlooked, consigned to providing information on market status only.

As an academic discipline, "Agricultural Marketing is the study of all the activities, agencies and policies involved in the procurement of farm inputs by the farmers and the movement of agricultural products from the farms to the consumers. In developing countries, it is understood to compose of product marketing and input marketing with actors that range include farmers, traders, wholesalers, processors, importers, exporters, marketing cooperatives, regulated market committees and retailers"[1].

Marketing is also defined by Philip Kotler[2] as a human activity directed at satisfying the needs and wants through an exchange process. The American Marketing Association defines marketing as the performance of business activities that directs the flow of goods and services from producers to users. Emphasis is drawn to the qualifying function to direct the flow of goods from producers to meet the demand from users. This direction comes from understanding the consumer, converting such information into demand matrices and standards, and sharing it as market intelligence with producers, to deploy the relevant means to execute the exchange.

The term agricultural marketing, is conversely, used indiscriminately to infer an umbrella term that comprises all the activities involved in the supply of farm inputs and output - including all those operations which are related to the procurement, collecting, grading, storing, food and agro-processing, transportation, financing and selling of the agricultural produce. In effect,

[1] Agricultural Marketing in India, SS Acharya & Agrawal, 6th Edn 2016
[2] Marketing Management: Analysis, Planning and Control, Kotler 1972

marketing is imagined to include all overarching aspects of agribusiness, though excluding the core activity of cultivation. This all-encompassing interpretation actually covers the full range, of pre-production and post-production functions; the input and output supply chain, agri-logistics, food & non-food processing, distribution, retailing, etc., of all agribusiness. Nonetheless, each is a specialised sector, some have even been assigned the status of industry. The market demand analytics and associated information that inter-connects these business operations, and a core function of marketing as a service, tends to get largely neglected.

Although, as an academic subject, the study of agricultural marketing may embrace all topics of the supply chain, the intention of such study is to arrive at an understanding of the physical flow of goods to and from farms. This operational understanding is with the purpose to ensure that marketing as a function, can be pragmatic when providing market information and intelligence, to be relevant in guiding the material flow. This market intelligence normally flows backwards from fork-to-farm, in making the output supply demand-linked.

These tenets of marketing come into play when an individual opts to start any venture for commercial purposes. For a farmer engaged in an agricultural enterprise, both input and output marketing determine the net income from the venture. The comparatively higher rate of growth in production, implies that inputs to farms have, in comparison, been systemically marketed. The ongoing food losses, coupled with inflationary pressure on most output and food items, indicates that output marketing has not kept pace with production. The output from farms has not met equal and necessary support from agricultural marketing in India. As a result, though the inputs find farmers as ready consumers, the output is unguided in finding optimal value. The farmer is effectually a bad purchaser of the inputs, as well a poor seller of his/her outputs.

Marketing in the agriculture value system implies both input marketing and output marketing. Input marketing provides information that will lead to evidence based planning for the timely and reasonable supply of seeds, fertilizers, plant protection technologies and other equipment and machinery that contribute to farming. Output marketing starts when the produce attains a form in which it could be collected for further economic purposes and exploitation.

This volume lays emphasis on output marketing, while input marketing will be discussed in later volumes dealing with production and productivity.

The farmers' produce is evacuated through market places that act as a platform for exchange. Prior knowledge about consumer demand, across regions, is critical to develop efficiency in the sourcing, supply and distribution across the country. This is also influenced by various economic considerations, and on the technical and logistical capabilities to connect the produce, involving post-production activities of aggregation/assembly/pooling, sorting/ assaying/testing, transportation, food/agro-processing, storage, distribution and retail. Marketing, as a support function, helps to direct the other activities, for greater optimisation of the costs involved and for improved value realisation.

To make the agricultural enterprise cost-efficient, and to achieve desired growth, the foremost input relates to understanding of the past, current and future demand for each agricultural produce - which is the purposeful role of all marketing.

For the purpose of this volume of the report, discussions on marketing will therefore also refer to providing intelligence and information that helps to direct the supply of agricultural produce to consumers in sufficient quantity, at the time and place, as needed by them. Two main scenarios emerge from a failure in this function;

a) when the marketing system fails to provide such relevant information of demand, any growth in production has little value and little contribution to farmers or society;

b) further, if the surplus produce does not move to the appropriate markets and bring additional revenue to farmers, the situation is a disincentive for future production.

Understanding the market, means comprehensive forecast of demand by locations, compliance with food safety and applicable standards, acquiring new consumers to support farming growth, observing applicable rules and monitoring regulatory changes. While the activities to take the produce to market, are driven by enterprises and supported through Ministries and agencies for their infrastructural needs, the essential backing of information on demand and the freedom to trade, is frequently observed to be incomplete in India.

The Agricultural Marketing System refers to other governmental systemic interventions in rules, regulations and policy. From a governance perspective, marketing as a system, will include reforms to enhance farmers' access to a unified market, formulation of standards and adherence to food safety standards. The government also regulates the flow of goods, to and fro farms, and therefore maintains a role to provision the related market infrastructure and provide the other basic enabling infrastructure for agri-businesses to flourish. The agricultural marketing system therefore also relates to economic growth of the agriculture sector and ensuring safe and affordable food to consumers, both of which are directly linked to the food security of the country. Managing the agricultural ecology and the impact on the climate, are other matters of concern that relate to the agricultural marketing system.

Since the agricultural markets in India are regulated, the agricultural marketing system is, therefore, a meld of government support mechanisms for marketing infrastructure, rules and regulations. Marketing is a specialised service that provides market demand analytics and information, to guide the farmers' production and expedite other post-production activities, for meeting the desired outcomes.

The National Commission on Agriculture (1976), as well the National Commission for Farmers (2006), had emphasised that it is not sufficient to produce a crop or animal product; it must be marketed so as to return value to the producer. Increased production resulting in greater marketable surplus, is complemented by increase in demand from the population. However, the surplus produce does not always find a suitable market, leaving demand unsated. This

situation of surplus conjoined with unfulfilled demand, necessitates a rethink on the agricultural marketing system in the country. The discourse on marketing needs to be about how it contributes to the supply chain, and not as an outlier of the integrated value chain system.

1.2. Objectives of Marketing

The report of the National Commission of Agriculture (1976), discussed agricultural marketing in Part XII of its fifteen part report (under supporting services and incentives).

The Commission stated that the objectives of an efficient marketing system, are[3]:

(a) to enable the farmers as primary producers to reap the best possible benefits;

(b) to provide facilities for lifting all the produce the farmers are willing to sell, at a price incentive;

(c) to reduce the price spread between the primary producer and ultimate consumer; and

(d) to make available all products of farm origin to consumers at reasonable price without impairing the quality of the produce.

A recent addition to the objectives of agricultural marketing, is to contribute to the doubling the famers' income by 2022-23.

After almost 40 years, although the basket of produce has changed shape and the technologies have altered the way goods and information are moved, the above objectives continue to remain relevant. Nevertheless, in 2017, marketing is no longer an afterthought and has far greater prominence, tending to supersede all other interventions in priority. Marketing is now the forethought to develop agriculture into sustainable agri-business.

As a corollary, the marketing system has greater responsibility to deliver relevant flow of market information, for farmers to be appropriately demand linked in all their farming and post-production activities. Without associated demand information, farmers will seek cost plus pricing rather than optimal demand linked value for their produce. The information from the marketing plays two crucial roles to empower the producers capable of producing marketable surplus. The first, by providing them with relevant demand linked information on desired quality, standards and specifications of the produce. The second, to provide information that helps the supply chain to become efficient by functioning to service a pull mode into markets.

From the perspective of doubling farmers' income, market linked farming, investment in the supply chain, market expansion and minimising losses are the desired outcomes from agricultural marketing policies. These outcomes can help affect a transformation in the income status of farmers.

[3] Report of the National Commission on Agriculture, 1976

1.3. Outcomes from Agricultural Marketing

Agricultural Market networks were originally conceived to channelise the production of foodgrains, fibre crops and spices, and for regulating their trade. This originated at a time of deficit production and the marketing infrastructure was accordingly designed into handling yards and bulk warehousing networks, and did little to encourage direct participation of farmers with other new marketing opportunities. The new opportunities came from crop diversification and changed consumer preferences, which resulted in a value and volume shift, away from the original set of targeted crops.

The consumer demand shows a marked preference and growth in diary, fruits, vegetables, poultry and meats, each with a distinctive mechanism for their supply chain and marketing requirements. Future market development intervention, will need to cater to the full basket of agricultural produce. The value and market linkage will be differentiated for this varied produce basket, compared to the earlier focus on foodgrains and fibre crops.

The result of a good marketing system are several, but some desired common outcomes are:

i. **Monetising the Produce:** marketing facilitates the sales of agricultural products. The monetised exchange or sales transaction of goods, is a result of the value assigned to the quantity of produce being exchanged. The value is factored by the demand and supply status, which in turn is impacted by the marketed volume and the asking price. The monetisation of the agricultural produce is very important as it integrates agriculture with the national economy and contributes to the GDP. Hence, intelligence on market demand to establish quantity and quality, as well as transparent price discovery is necessary to outcome the equitable monetisation of the farmers' produce.

ii. **Demand Signal Platform:** Barring cases where demand is artificially buttressed, marketing systems have purpose to balance the demand with supply. The bridge in the form of agri-logistics, function to execute this purpose. The sum value realised and even the unit price of goods being exchanged for money, depends on this balance. The balance depends on the quantity being supplied and the total cost of supply. When this balance results in a price point that is higher than the total cost of supply (production plus logistics), the ensuing margin is shared by the stakeholders involved in the supply chain. Misinterpreting the demand results in either making the product too dear, which impacts by lowering the offtake, or by feeding a glut like situation to impact the unit price downwards. Unchecked, both scenarios result in reduced value and wasted efforts. Moderation of demand supply gaps is a desired outcome of marketing.

iii. **Market growth:** India's agricultural environment is transitioning from a state of deficit towards a status of surpluses. This has been mainly brought about on the back of intensive farming efforts, inducting new technologies, improved seeds and planting materials, better irrigation, etc. The market realities have also changed due to increasing liberalisation, privatisation and globalisation, as well changes in consumer preference. Agri-logistics technologies have also modernised to allow farm produce to connect with

demand further afield. These are opportunities to grow the markets in size and diversity. An aware and competitive marketing system, will attune itself to suit this evolution in India's agriculture, and adjust to capture and exploit new markets. The opening up of the markets to promote competition and long term growth as a desired outcome.

iv. **Capital formation and investment in technology:** Marketing is no longer a simple activity of arranging the assembling of produce at an open yard and finding ready takers for the value assembled. The produce being output, the quantity being collected, the distance to secondary user or consumption market and aspired quality of produce, stipulate unique demand on the type of facilitation needed from the logistics chain. As marketing gets more effective and determines the specifics to meet its objectives, it will generate the need for investment in modern supply chain infrastructure, and in suitable information technologies. An effective marketing system also involves the flow of information to guide the cropping cycles, and therefore, also has a role in incentivising the use of technology across the full range of farming practices. The outcome is added investment in agriculture allied activities and job creation.

As the country advances in its economic development, there are discernible shifts in consumption patterns. Agricultural marketing can assist to tap into these changes and enlarge the market range of farmers, provide inputs to guide associated policies, such that it inspires the development of economies of scale, both in production and the post-production activities.

1.4. Subsistence to Surplus Food Economy

A few decades ago, in 1970, when the National Commission on Agriculture was constituted, agriculture had a more dominant role in the Indian economy, contributing nearly half of the national income, and providing employment to about 70 per cent of the working population. The country had emerged from a state of high food insecurity in the mid-1960s. The period of insecurity, brought immense attention on regulating the agricultural markets, not only to protect the farmers and provide an environment of fair trade, but to monitor and control the status of production and availability of foodgrains. The marketing system and government interventions were thereby devised with the agenda to give impetus to agricultural production, to regulate the supply of food and to assure the country its food security.

This was achieved through policy measures, initially adopted in the mid-1960s, such as input subsidy, minimum support price, public storage, procurement and distribution of foodgrains, trade protection measures and regulation of markets. The policy interventions from 1960s, were primarily meant to avert situations which may again lead to a deficit.

At a time of sustained deficit, it was obligatory to regulate, to control and monitor the production and the flow of food across the country. Comparison is recalled from times when supply of cement and rubber was in deficit, and it was common practice for the government to regulate the supply of these items, to prevent monopolistic marketing and other unfair practices. However, these controls were done away with, once the supply side was developed, and the market was freed to function in an open and a competitive environment.

India's agriculture has travelled a long way from a period of subsistence farming to that of surplus output, calling for a paradigm shift in the earlier stance taken with the agricultural marketing system. It emerges that agriculture markets, established in 1960 to handle the deficit, are now inefficient in handling marketable surplus efficiently. The marketing system needs to promote alternate concepts, e.g. provisioning of alternative market channels, participation of private sector, using e-platforms for market expansion and enabling a stable and farmer friendly market environment.

Compared with the production at the start of the 1960s, India now harvests 40 times as much tomato, 14 times more potato, 8 times more wheat, thrice as much in poultry and meat, 13 times more fish, 8 times more milk and almost 40 times more eggs. The scaling up of our food production far surpassed the growth in population – in comparison, the population grew only 2.9 times, from 460 million in 1961[4] to an estimated 1325 million in 2017[5].

The agriculture marketing system is needed to help the agricultural sector to adjust to this changed scenario, from a marketing environment that was designed for a time of subsistence to one where marketing of surpluses is required. Volume-I of this report, shows historical trends in production of a wide variety of agricultural produce.

1.5. Role of Marketing in Monetisation

In India, as late as 1960, it was estimated that at least one third of India's agricultural production and about one fourth of its Gross National Product (GNP) was non-monetised[6]. It is well known that subsistence farmers sell a part of their output to enable themselves to buy a few necessaries and to carry out other minimum money payments. They also sell their labour, however, with the same purpose in mind. In subsistence farming system there is low marketable surplus due to which exchange function is stunted. The absence of income or savings had made agriculture a non-monetised sector in pre-1960's.

However, the situation changed in the post green revolution phase. Market infrastructure in agricultural markets, policies and institutes were developed so as to facilitate the sale of farm produce, and these market yards became the first point of monetisation. Agricultural markets geared up to play an exchange function, with the agenda to allow agriculture become a profit oriented commercial activity. The flows and interconnections that interplay in agri-markets can be summarised as follows:

- The flow of agricultural produce, mediated by transportation, storage, processing, etc.
- The flow of money, reconciled though cost, price, income, margin, saving, credit, etc.
- The flow of information on demand, manifested in quality, volume, specifications, etc.

[4] Census India, 1961
[5] MoSPI, 2017
[6] The Role of Marketing in Economic Development of Developing Countries, Alex N. Ifezue (2005)

These will transpire through a series of coexisting activities that are undertaken by a range of operators. A field research in the region of Coimbatore, in early 1980s by Harriss-White[7], found a total of 51 different activity combinations, among 149 "marketing" firms. The activities like buying, selling, brokering, transport, packaging, grading and processing are the operating links of the value chain system, resulting in the tangible flows and the fungible exchanges.

Monetary exchange can be directed through instrumented arrangements such as vertically linked contract farming, leased farming, commodity futures, or horizontal access to multiple spot markets. Each is an opportunity option, decided by capabilities of the interacting farmers and consumers of the produce. The transactions can be initiated by individual farmers, farmer groups such as cooperatives, FPOs, associations, industrial farms, etc.

Since a market is intended to function as an exchange, where goods are monetised, any monopolistic arrangements need to be warded off. The marketing system, therefore, needs to open up the markets to generate greater competition and transparency for the benefit of farmers.

To monetise agricultural products, the marketing system has to be effective, so as to promote transparency and cross-stakeholder linkage, such that each related activity can be performed efficiently. An effective marketing system needs to be responsive to changed dynamics, and streamline the flows that relations between input suppliers, farmers and consumers. As production sees enhancement through productivity measures, the marketing system is seen having a major role in enhancing income of farmers.

1.6. Government's role in Marketing

From the perspective of the government, agricultural marketing has a role to make production, supply and trade of agricultural produce sustainable, economically beneficial and equitable. The added objective of securing the nation's food, also makes the government a buyer of produce, and this too has an impact on how agriculture progresses.

The marketing system had focused on informing market price (status) and not on market intelligence (demand forecast). At a national level, the government can also provide market intelligence as a service, as well as tweak its regulations to expand the market footprint of farmers, internally and internationally. Impetus to streamline and grow agricultural trade will showcase that India can be the forerunner that breaks the trend, that economic development dilutes the business of farming.

Agriculture can be the core service of India, provided that policies and information flow emphasises on linking agriculture with markets, expands the range of markets and makes the market channels compete for tapping into the Indian farmer.

[7] Three roles of Agricultural markets, Economic and Political Weekly, Vol KLVII no. 52, Harris-White, Ali Jan (2012)

With agriculture having gone through various transitions in its development, the policies of the government also require to adapt to the changed scenario in agricultural marketing.

1.7. Transitions in the Marketing System

Along with a transition of agriculture, the Agricultural Marketing System has also evolved to a certain level.

Table 1.1 Five major transitionary stages witnessed in Indian agriculture

Phase	Status and Approach	Remarks
Phase I : Pre-Green Revolution Period (1950-65)	**Status**: Deficit in food production **Approach:** Marketing system designed to handle deficit, regulate trade and manage food security.	• Improved food security through agrarian reforms & large scale investment in irrigation and power. • Enacted Zamindari Abolition Act (1950) - organise agriculture and animal husbandry on modern-scientific lines, abolish *begari*
Phase II : Green Revolution Period (1965-80)	**Status:** Self Sufficiency in Food grains, start of 'Operation Flood' **Approach**: Marketing system to incentivise output and manage its distribution through procurement.	• Advent of Green Revolution (distribution of high yielding varieties) • Number of important institution set up during 1960 and 1970 (Food Corporation of India, CACP, CWC and State Agriculture Universities • Nationalisation of Commercial Banks • NABARD and Regional Rural Banks (RRB) established • Cooperative Credit Societies strengthened
Phase III: Post-Green Revolution Period (1980-91)	**Status:** Diversification **Approach**: Expansion of technology to other produce types and regions	• Diversification towards high value produce • Focus on commercial horticulture, setting up of Coconut Development Board and National Horticulture Board
Phase IV: Economic Reforms Period (1991-2015)	**Status:** Approaching surplus **Approach**: Liberalisation and toward greater international market access	• Improving the functioning of markets and liberalising agriculture trade. • Model APMC Act 2003 to increase private sector participation in marketing and processing. • Signing of AOA of WTO
Phase V: One nation, One market, One tax ICT enabled marketing (2015 onwards)	**Status:** Food Secure but problem of plenty emerges **Approach**: Towards a National unified market	• Electronic National Agricultural Market • Model APML Act 2017 allowing for operation of alternate markets and unified national markets • GST roll out, streamline inter-state trade.

The Agricultural Marketing System in the country, had for a long period, mainly focused on market infrastructure and regulations, where strategic strengthening of the distribution and the supply chain network for agricultural produce was largely ignored. Farmers were provided options to off-load their produce at the nearest market yard, while the option and ability to directly connect with markets farther afield was not part of the strategy.

However, markets are moving in a direction where greater private sector participation is

envisioned, as well as in other supply chain infrastructure. To strengthen private sector operations, the marketing system needs to divert attention on its own key role. This role is to manage and inform the quantitative demand from markets, in advance of final price discovery, so as to make the other functions more demand linked and be efficient.

1.8. Annotation

The reasoning behind marketing requires a rethink, to move away from overseeing the flow of produce (from farm-to-consumer), towards a function that underlines the flow of market linked information (from fork-to-farm), to guide and mentor the market and logistics networks to efficiently handle surpluses that are generated.

Agricultural marketing entities have focused on informing market price (transaction status) and not much on market intelligence (demand forecast). Marketing as a service requires to provide both intelligence and information, to allow producers to adjust to the changes taking place in the external market environment, to make farming market linked and economically sustainable.

The Agricultural Marketing System incorporates government policies and strategies, for enabling efficiencies in the supply chain activities for agricultural produce. The marketing system, needs next level reforms to give impetus to modernise the markets, expand upon the market network and promote more market linked activities at village level.

Agricultural marketing as a system has the main objective to catalyse and support the monetary exchange from farm produce, to organise the commerce that a farmer commences upon, starting from when the farmer plans to sow the first seed. The agricultural marketing system of the government, must adopt market intelligence as a function, to provide scheduled marketing inputs to all stakeholders, as an important and ongoing undertaking.

Key Extracts

- Marketing is a vital role as a link mechanism, between producers with consumers. Marketing function is intended to direct the flow of goods to crystallise demand, for productive effectiveness & efficiency of agriculture as a business.
- Marketing systems function through policies to build competitiveness with in-built mechanism to reduce monopolistic and oligopolistic operations.
- Marketing policies are expected to create an enabling environment for varied instruments such as contract farming, farmer producer companies, direct marketing, futures market, etc.
- The agricultural marketing system needs to be revisited on the basis of efficiencies achieved and its effectiveness, keeping in mind the larger produce basket.

Chapter 2

Marketing Effectiveness & Market Efficiency

Effectiveness and efficiency – Being effective *is about doing the right things to pursue purposeful goals, while being* efficient *is about doing these things right in a gainful manner for maximum productivity.*

2.1. Effective Marketing System

The changes in the agrarian environment in India, requires an associated adjustment to the goals pursued by the marketing system. A mind-set shift, from facilitating and protecting agricultural trade at predefined locations readily accessible to farmers, towards one that expands the market ecosystem, encompasses a wider array of participants and empowers farmers to access locations further afield is required.

The farmers no longer cater to just the local demand as their produce is channelled to populations remote from production areas. Whereas earlier, a marketing system was considered effective if it provided for market yards within immediate range of farms, the yardstick today needs to include, the interconnectivity between markets and the value dispersion between farms and consumers.

An effective marketing system is not deterred by operational inefficiencies in the flow of produce, but counters those inefficiencies by the effective dissemination of market intelligence (demand) and information (price), and by easing the rules and regulations to promote more relevant and responsive supply chains.

The effectiveness of an agricultural marketing system will vary depending on the situation of the target regions, consumer, product and technologies in hand. Besides, global factors can come into play for certain commodities, where forecasting and pre-empting factors outside of own region is also expected to contribute to marketing effectiveness.

From perspective of enhancing farmers' income, to demonstrate the efficiency and effectiveness of the marketing system, the specific goals and factors to adopt can be as follows:

Demand signals to supply side – a well organised marketing system will communicate backwards from Fork-to-Farm, in advance to production, such that the entire supply chain will function to service the forecasted demand. Market intelligence, on basis of past trends and predictive analysis is a key driver, especially in times of undirected surplus production. An effective marketing system will strive to minimise the blind push into markets and instead promote a pull mode from markets.

Increase in revenue generation – a well organised marketing system will increase the sum total of revenue generated in the agricultural value chain system. An effective marketing system will also aim to persuade that there is more equitable sharing of the net revenue generated, among all the stakeholders in the value chain system.

Market expansion rate – organised marketing will always seek to open markets and support extensive supply chain networks. Agricultural trade, when encompassing cross regional demand and supply, results in providing a stabilising influence on the economics involved. The effective marketing system will always promote the expanding of the market range of the producer/supplier and provide a choice of purchase for the buyer. Market expansion also boosts vibrancy in domestic agricultural trade.

Unified market – a well organised domestic marketing system will integrate by developing extensive connectivity across a network of demand centres and supply regions, creating uniformity in the market arena. Treating the country as one market is essential. Effective integration of the marketing system would reduce price dispersion across the country (variation in prices across sellers of the same item), especially that which occurs due to regional demand inconsistency. A unified market dampens value fluctuations.

Increased competitiveness – a vibrant marketing network will create a competitive market environment. Transparency and optimal price discovery is a major consequence from competition, which is one of the aims of effective markets. Competitiveness also leads to improved resource optimisation and brings about cost efficient practices. An effective market system, therefore leads to efficiency in output marketing, and measures would include food loss, cost of holding inventory, inventory-turn ratios, etc., and profitability.

Facilitate selling channels – an effective marketing system would create alternate market channels to widen the consumer base. The agricultural market yards currently function as singular transaction points. A primary transaction with farmers happens at first instance, with no option of facilitating the sale at another market location. No option is available to a farmer at these yards, to avail marketing services to do a transaction at another market location or channel (e-commerce, institutional, etc.). Therefore, a marketing system is effective if it promotes multiple selling or market options.

The National Commission on Farmers (NCF), constituted in 2004, had recommended a single market for farmers. The Commission also recommended that agricultural marketing be placed on the Concurrent List. The NCF further stated that marketing, storage and processing of agricultural produce needs to shift to one that promotes grading, branding, packaging and development of markets for local produce, domestic and international. The distinction made is that the marketing system needs to become effective though developing better post-production care and open options to access and connect with new market channels.

Marketing effectiveness is a matter of strategic intent, whereas, the factors to assess efficiency are a measure of operational or tactical results.

2.2. Efficiency of Markets

Markets are operational hubs where the movement of goods from producers to consumers is initiated. The main objective of these operations is to fulfil the physical delivery as per the individual transactions. Where such operations are done at the lowest possible cost, consistent with the provision of the services desired, may be termed as efficient.

Efficient market operations for farm products ensures that[8]:

(i) Increase in the farm production is translated into a proportionate increase in the level of real income in the economy, thereby stimulating the emergence of additional surpluses.

(ii) Good production years do not coincide with low revenues to the producers achieved through effective storage, proper regional distribution and channelizing of latent demand.

(iii) Consumers derive the greatest possible satisfaction at the least possible cost. An efficient marketing system is an effective agent of change and an important means for raising the income levels of the farmers and the levels of satisfaction of the consumers. It can be harnessed to improve the quality of life of the masses.

A number of approaches are there for assessing marketing efficiency in a particular market channel of a produce. Thus, market efficiency depends on: (i) the effectiveness with which a marketing service is performed (ii) the cost at which the market operations are performed (iii) the effect of this cost and the impact of the service on production and consumption.

An ideal measure of marketing efficiency, particularly for comparing the efficiency of alternate markets / channels, should be such that it takes into account: (i) total cost of operations; (ii) net operating margins; (iii) income received by the farmers, and (iv) prices paid by the consumer.

Any change that further reduces the costs of accomplishing a particular operation without reducing consumer demand indicates an improvement in the market's efficiency. But a change that reduces costs and also reduces consumer satisfaction does not indicate increase in the efficiency. And a high level of consumer satisfaction even if at a higher operational cost may mean increased marketing efficiency, if the additional satisfaction derived by the consumer results in increased demand to outweigh the added cost incurred in the marketing operations.

2.3. Importance of Effective Marketing

In the current day situation, the surplus production is not finding markets. The unfulfilled demand is reflected in higher prices in different part of the country. It is important that consumer has a choice and free trade be promoted.

The shortfall in the marketing system, to assess and project demand signals in advance, has

[8] Source: Agricultural Marketing in India, Acharya and Agarwal, 6th edition, pg475-476

resulted in farmers following price trends as indicators to supply. Price is a measure that is post-circumstantial. The circumstances may not repeat next season or even within a season, and reaction on production side, to price alone, is a weakness of the system.

Price goes up, farmers produce more next season, price falls down, farmers change crop, and the seesaw cycle repeats. Where this seesaw, can result in decreasing the extremes in the swings, both in production and price, leads towards an eventual state of equilibrium. This convergence in fluctuation is a result of unguided, action and reaction. As a result, the demand and production link remains stagnant and future growth is stunted, while price and supply reach a steady state.

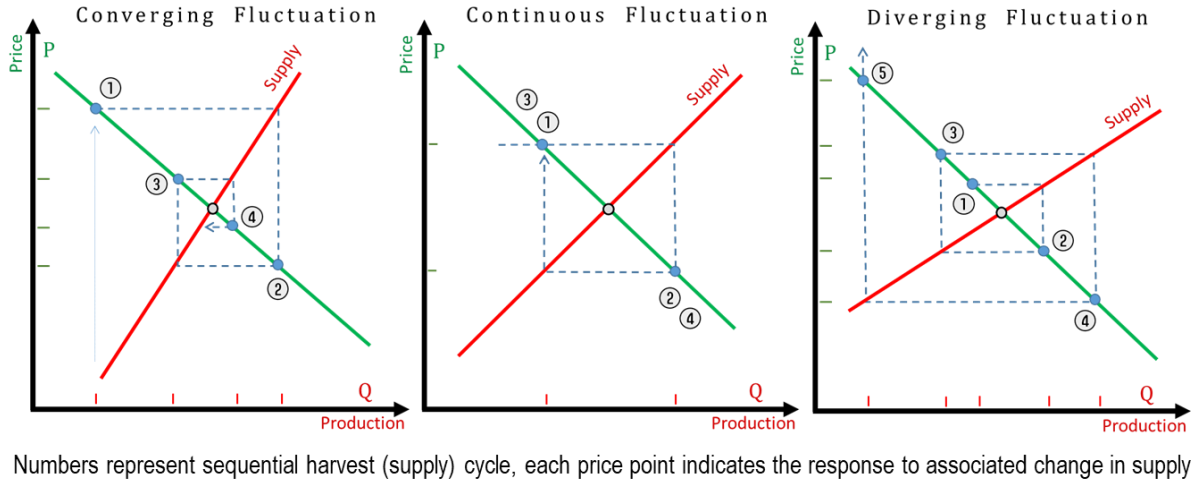


Figure 2.1 Cobweb relationship

Represented in charts as a spiral of price fluctuations, the impact can also lead to a continuous or sustained cycle of fluctuation, or even a diverging spiral of increasing fluctuations in price with seesawing supply. All of these are indicators of marketing inefficiencies. Agricultural marketing systems must aim to dampen the cobweb reactivity through advance and strategic information sharing. The trigger to supply needs to be forecasted demand and not the price.

The imbalance represented by the lag effect between surplus output and price drops, can results in a gradual fall in production and lowering price fluctuations until an equilibrium is naturally found. However, the reverse can happen, where the situation can spiral out of hand.

Currently the marketing system, though the Agmarknet portal shares price information and not projected demand. Therefore, the system is geared to provide price information as indicator of the ongoing transactions, whereas, the producer needs to know forecasted demand projections (volume) to take informed decisions, all the way back to crop planning. Therefore, the outcome of the information from the system is mismatched from the need of the farmers.

2.4. Containing the Inequity

An increase in price is not always good for the marketing system and indicates inefficiency in the system. Increase in price can result in stifling the demand, triggering a shortage in

production in the next season (cobweb model) and eventually a reverse swing occurs. This market inefficiency is also to the advantage of commodity traders that have capacity to hold inventories until the next upward price swing. For the famers, the temporal increase in price of a crop, is a false signal to sow more of that particular crop for the next season.

This lag effect between price signal and sowing patterns is an acute failure of the marketing system. The price signal is ex-post (after sales), and the farmer's reaction is ex post facto (after the fact has relevance). Marketing system is efficient if it provides a price signal that is ex-ante (before the next sowing season). Demand forecasting with volumetric information and prospective price determination, even if with some elasticity, is a far better signal to farmers than the current system with an annual lag in its effect.

Price, production, consumption are intrinsically correlated. A fall in price is not a failure too, if met with equal or higher increase in volumes, as the net value is a factor of price and quantity. However, any fall in price local to a region (at *mandis* around a producing area), or in a period of time (around harvest season), is a sign of inefficiency when left unattended by the marketing system. This happens when markets are not spatially and temporally integrated.

The marketing system is inefficient when it cannot address imbalance between demand and supply. The tactics used to meet demand include operations over place, time and form.

The inefficiencies in the system impact he farmer negatively, but become opportunities for others. Commodity traders will make procurements at harvest season and store the foodgrain for transactions at a higher price point after some time, when supply is limited. Farmers could do the same, provided they had the economic capacity to bear the inventory holding cost. Credit against warehouse receipts and other solutions can satisfy the cash flow requirements of a farmer, while allowing them opportunity to avail the price arbitrage over time. Storing capacity dedicated for use of small farmers, or group of farmers, especially possible in case of foodgrains, can also serve this purpose.

There can be many reasons for surplus production not finding a market, but the main reason is lack of marketing linkages for a large number of produce types. The market infrastructure does not have the capacity or capability to handle the production and link it with the rest of the country. This lack of integration of markets needs to be corrected. Most of the market development is done at state level, which ignore the concept of a national market system, focusing on intra-state marketing only.

Lack of information from demand side to farmers results in reverse interrelation between production and income. Production gluts with price slumps, and production slumps with price bumps are commonly seen, at times to extremes. While it is natural to have an inverse relationship between market supply and pricing, demand analytics plays an important role to understand and address the extremes. A drop in price should not automatically translate into a drop in income, since larger volume is available to sell and income should ideally be

maintained. By mapping demand at markets, the available surplus can be spread and the quantum of production can be directed to other destinations of demand.

Unlike for crops with long holding life and having a "spread in time", in perishables, a production glut is more local to a region, while a supply slump may exist in another part of the country. Marketing needs to appropriately develop a "spread in place" by spatial movement of the goods to a place where demand exists. Such monitoring and linking of demand is a capability that the marketing system has to develop.

In case of Central Pool procurement, holding the stock close to population centres, makes the system more efficient and spreads its availability in advance of demand. This tactic also avoids large inventory build-up in the production areas – this normally happens because warehousing infrastructure was developed on the basis of production and not linked to future demand. The distribution of warehouses can be rationalised depending on demand projections (from public distribution and from secondary processors).

2.5. Indicator of Marketing Efficiency

Marketing efficiency analysis has generally focused more on transaction levels or the overall efficiency of the supply chain operations. As such, most assessments on marketing efficiency highlight broken links in the value chain system.

There is the need to have a marketing intelligence mechanism that monitors and analyses other economic signals for purpose of marketing inefficiency.

A measure of the efficacy of the national marketing system can be the extent of price dispersion for the same produce, across multiple markets in the country. Price dispersion for farmgate prices was presented in the Economic Survey of India (2015-16) for select crops.

The graph indicates the ratio between the lowest to the highest price for the same crop in the country. This price dispersion, at farm-gate, is clear indicator for the need for a single "one market" ideal. Some reasons for farm-gate price dispersion would include onwards connectivity from farm-gate to next level market, the concurring demand

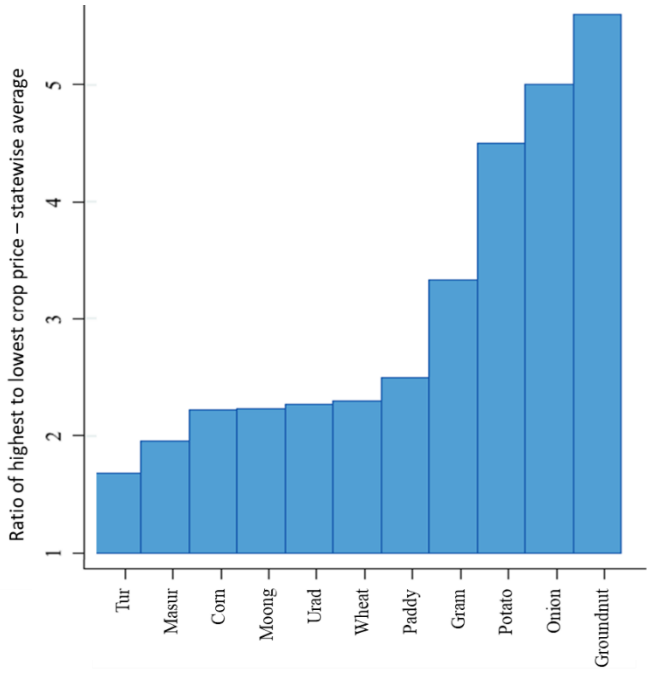


Figure 2.2 Price Dispersion at farmgate - select crops

Source; Economic Survey of India, 2015-16 (NSS- SAS 2013)

or supply fluctuation at the time of farm-gate sale, the storability and sensitivity of crop to other dynamics, etc. However, the marketing effectiveness is measured through efficiency achieved in reducing the overall price dispersion at farm-gate.

Price dispersion also happens between farm-gate and consumer. Some dispersion is expected due to reasons which include the associated logistics cost to connect farm-gate with wholesale market at consumer end. Crop that has regional specialisation for production will normally have a cost plus increment at consumer end in other regions. The causes of market segmentation are many – differences in remoteness and connectivity (rural roads), local market power of intermediaries, degree of private sector competition, propensity of regional exposure to shocks, local storage capacity, mandi infrastructure and farmers access to them, storage life of the crop and crop specific processing cost[9].

The prevailing cost efficiency also has impact on price dispersion, with some dispersion being expected and inherent to the system.

Equation 2-1

(1) (2) (3) (4)
Cost of production + cost of logistics + risk + marketing margins = natural price dispersion

Logistics (2) and risk (3) are correlated to food mile (distance) and fuel, holding life or sensitivity of the produce, technology used, monitoring and regulatory compliance, inventory holding cost, etc. However, extreme price dispersion that cannot be explained by the cost of risk and the logistics involved, indicate inefficiencies in the marketing system and results in sharp price wedges between the consumer and farmer.

Marketing margins (4) are escalated in a multi-layered marketing network that has numerous intermediaries between farmers and wholesale market. This factor also makes for long supply chains, despite the destination markets remaining at short distances. A long supply chain results from multiple stakeholders in the chain of custody as the produce moves to market, and dilutes the total share of value to be portioned across all players.

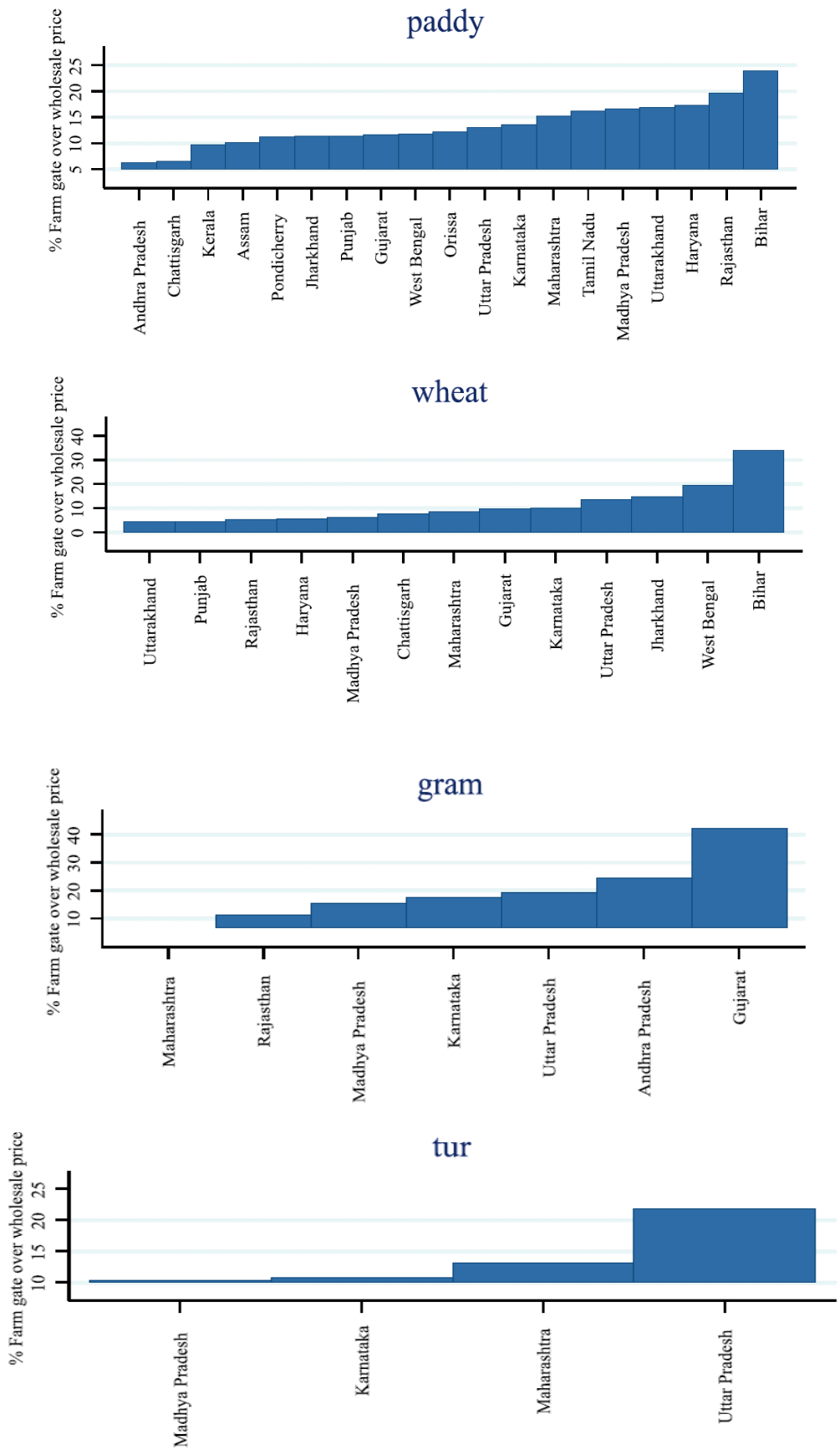
High price dispersion is also the result of value leakage due to high level of value chain segmentation and non-transparent pricing structure. Both impact upon the total value that is recovered at the end of the supply chain and normally such inefficiencies get passed on to the farmer. A few crop specific examples of price wedges presented in the Economic Survey are repeated in the next section, indicating the efficiency or lack thereof, in the fork to farm chain.

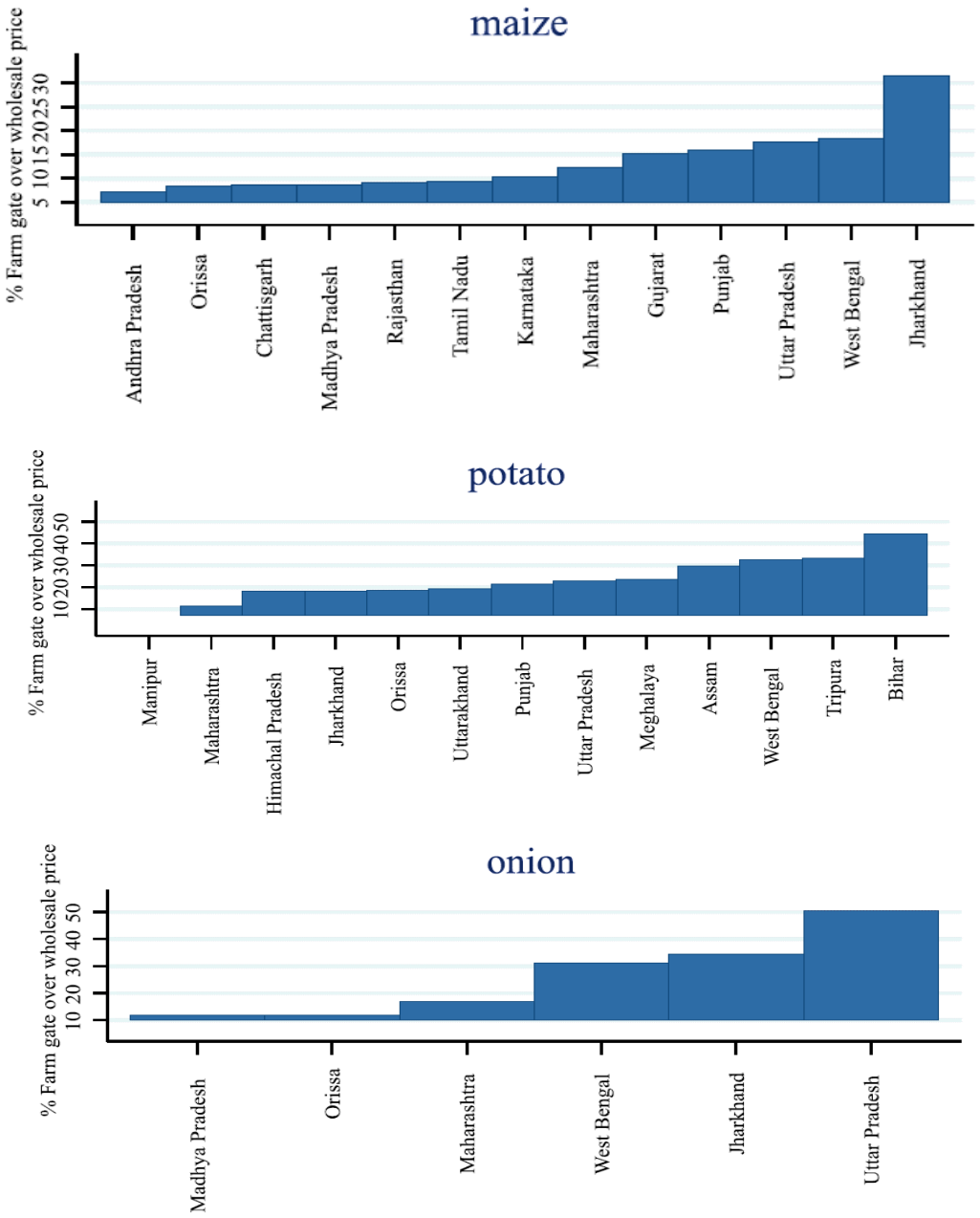
2.6. Crop specific examples of Market Efficiency

The price dispersion between farm-gate and whole sale market at consumer end (price wedge), is extracted from the Economic Survey of India 2015-2016 to indicate the efficiency status.

[9] Economic Survey 2015-2016

Figure 2.3 Price wedges between farmgate and wholesaler





These price wedges also provide clear indication of opportunity for agri-business entrepreneurs. High inefficiency areas, are target areas for businesses, to select and build models that can readily compete with the existing inefficiencies.

Among the crops represented, the biggest price wedges are for the perishable types, potatoes, onions and groundnuts. The wedges are lower for rice, wheat (two commodities where MSP notification is followed by government procurement).

Greater market integration is essential for farmers to get higher farm-gate prices. While the GST bill is a step in the right direction, a lot more needs to be done by the states, including, creating better physical infrastructure, improved price dissemination campaigns, and removing laws that force farmers to sell to local monopolies.

Additionally, similar price dispersion, or wedges, exist between wholesaler and retailer, which are also important indicators on the efficiency at last mile operations.

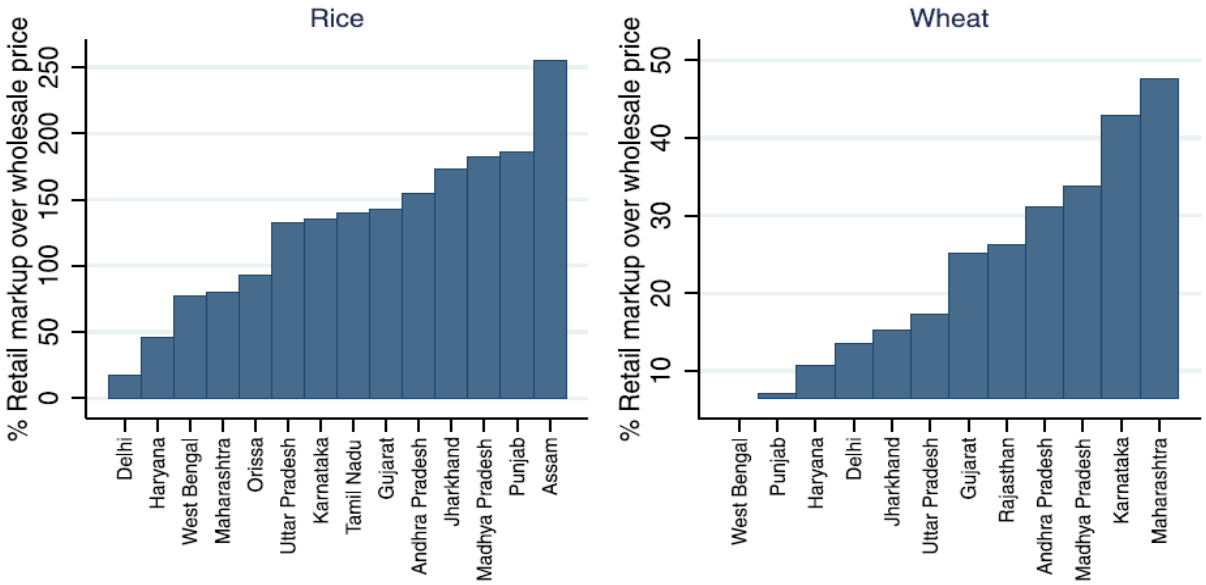
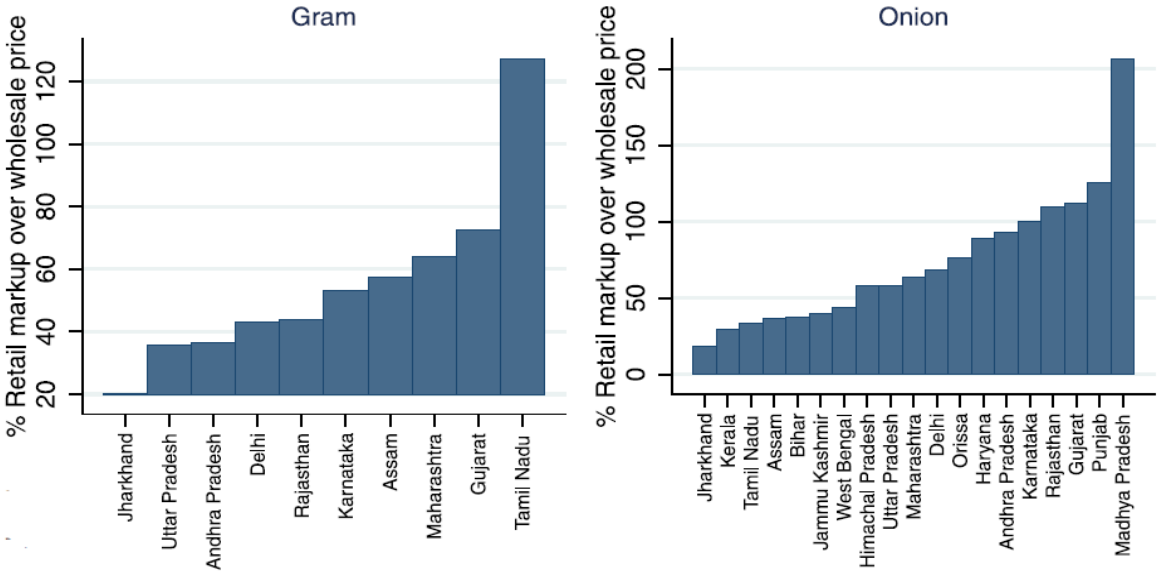


Figure 2.4 Price wedges between wholesaler and retailer



Extracted from Economic Survey of India, 2015-16

2.7. Marketing Policy

Growth and development of agriculture and allied sectors directly affects the well-being of a large population base, both rural and urban citizens. The immediate impact is also reflected in the prosperity and employment opportunity in the rural economy.

The development trajectory of the country is closely linked to the socio-economic development in the rural areas of the country. The larger share of the country is located in villages and they are contributors and growth drivers of the nation. In a country as diverse as India, the human backdrop and situational realities vary and development is not always uniform. There is

frequently the need for government level interventions to give direction for more equitable and inclusive growth.

Therefore, agricultural marketing, besides having function of managing market information, also has involvement of government, which intervenes to support agricultural trade, domestic and international. The purpose of agricultural marketing policies and regulations is to protect farmers from exploitation from market intermediaries and traders and also ensure transparent transactions and timely payment for their sale proceeds.

The Government, Central and States, implement various support mechanisms and undertake other interventions with intention to make agriculture more competitive and enhance income to farmers. The support provided ranges from price intervention, market intervention, provision of market infrastructure, other infrastructure, procurement of select commodities, etc. The procurement intervention by the government, makes it a market channel for the farmers. In doing so, the government influences the market dynamics. When procurement is done without objective planning on final end-use, the government can also upset the demand metrics, artificially buttressing crop production, without any strategic aim. Therefore, a close look at the procurement system is warranted, to align strategic reserves and gratuitous buying with consumer demand and future growth for farmers.

Effectiveness of government policy can be measured through assessing how much of the local produce connects, and is directly traded by farmers, with markets outside the production region. At the moment, a farmer will normally off load her produce at the first instance, in the hands of agents or local markets, leading to a larger than necessary layering of actors in the delivery system. This happened, since efforts were made to ease the farmers' first mile transaction due to past constraints in logistics connectivity.

This system provides farmers immediate access to primary level monetisation of their produce, and is necessary. Nevertheless, as the capabilities of the farmers develop, there is also the need for policies to support direct market connectivity. The concept of market infrastructure need not be only focused on developing centres of transactions, but also as village level assembly/pooling/packing to facilitate onwards connectivity to cross regional markets, with the operations under custody of the primary producer or first mile aggregator.

2.8. Annotation

Marketing effectiveness in a measure of expanding the market system to generate larger revenue streams and competitiveness. Market channel efficiency depends on reduction of marketing cost, adoption of technology in grading, packaging, transportation, storage, value addition, wholesaling, retailing and exploring economies of scale through aggregation.

The one-India market concept may benefit from placing agricultural marketing under the Concurrent List. While cultivation is limited to the land and area of farming operations, marketing has no boundaries and needs to operate on a pan-India level to meet demand across

the country, and further afield.

Among the crops represented, the biggest price wedges are for the perishable types, potatoes, onions and groundnuts. The wedges are lower for rice, wheat (two commodities that are produced by a large majority of farmers and where MSP declaration is followed by government procurement).

Greater market integration is essential for farmers to get higher farm-gate prices. While the GST bill is a step in the right direction, a lot more needs to be done at the State level, including, creating better physical infrastructure, improved price information dissemination campaigns, and reforming regulations that force farmers to sell to local monopolies.

Future marketing intervention by the State governments need to be align with the One-nation, One-market concept by laying greater emphasis on long term connectivity for agricultural produce, across states and geographies.

Key Extracts

- Marketing system help to direct and crystallize demand for productive effectiveness & efficiency of agricultural trade.
- Marketing systems develop capacity to ensure operational and pricing efficiencies in the market channels of different produce.
- Marketing systems play a vital role in servicing a link mechanism, for producers with consumers and allows price discovery mechanism to be transparent.
- There is a need for a market intelligence system that monitors and analysis other economic signal for the purpose of marketing efficiency.
- Marketing efficiency is also to be achieved by reducing farm gate price dispersion by creating better physical infrastructure, improved price dissemination and marketing policies to ensure transparency and timely payment to famers.
- Marketing systems function through policies to build competitiveness with in-built mechanism to reduce monopolistic and oligopolistic operations.
- Marketing policies can create enabling environment for varied instruments such as contract farming, farmer producer companies, direct marketing, futures market etc.

Chapter 3

Evolution of Agricultural Marketing

A historical perspective on agricultural marketing and the price support, through a system of policies, regulations and market interventions. The system has been evolving over the years and denotes that the system is influenced with market realities. Reforms are needed in response to assessments in socio-economic growth and to suit the changing business environment and the strategic needs of the country.

3.1. Marketing Perspective

Historically, the government has been largely focused on providing markets to provide farmers the platform to trade and meet regional demand. The government also extended support to provide price support, with the establishment of Food Corporation of India in 1964 and the Agricultural Price Commissions in 1965. The price support was initially in the form of notifying a minimal floor price and through direct procurement by FCI at a price that was higher than the minimal price.

Prior independence, the key concern of the Government related to agricultural marketing was to keep the prices of agro-raw materials for the industry and food items in check. The first regulated Karanjia Cotton Market was established as early as in 1886 under Hyderabad Residency Order. The first marketing legislation was the Berar Cotton and Grain Market Act of 1897, which became the Model Act for legislation in other parts of the country.

The provisions of this Act empowered British Resident to declare any place in the assigned district a market for sale and purchase of agricultural produce and constitute a committee to supervise the regulated markets. The then Government of Bombay Province was the first to enact the "Bombay Cotton Market Act" in 1927 and this which was the first marketing law in the country, which attempted to regulate markets with a view to evolving fair market practices. The then government, also constituted the Royal Commission on Agriculture in 1926 which made several recommendations for regulation of marketing practices and establishment of regulated markets.

The establishment of the Directorate of Marketing and Inspection in 1935, the enactment of the Act for grading and marking of agricultural produce in 1937, the conduct of commodity market survey and the establishment of regulated markets in the States are some of the other measures taken before Independence to improve the marketing situation.

After independence, during the sixties and seventies, most State governments enacted the Agricultural Produce Market Regulation Act (APMR Act). It authorized the States to set up and regulate marketing practices in wholesale markets. In the initial five year plans, the main thrust was on intensive agriculture. The expressed objective was to concentrate resources and efforts in specially endowed areas with adequate production agricultural potential in terms of water and infrastructure to achieve a quick break-through in production. Coinciding with the Green Revolution wherein productivity enhancement was achieved, the country witnessed

emergence of State regulated markets.

All primary wholesale assembling markets were brought under the ambit of these Acts. Well-laid out market yards and sub-yards were constructed and for each market area, an Agricultural Produce Market Committee (APMC) was constituted to frame the rules and enforce them. To cope up with the need to handle increasing agricultural production, the number of regulated markets has been on the rise. While by the end of 1950, there were only 236 regulated markets in the country, now the number is more than 6600. These are primarily wholesale principal markets comprising 2339 principal with their attached sub-market yards. In addition, the country has more than 22,000 Rural Periodical Markets or *Grameen Haats* under the control of local bodies, panchayats, councils, APMCs, etc., which lack even the basic amenities and marketing infrastructure.

Under the APMR Act, only the State Government could set up markets, thus preventing private players from setting up markets and investing in marketing infrastructure. Development of primary agricultural produce markets was taken up as an institutional innovation and construction of well laid out market yards was considered as an essential requirement for regulating the practices in primary wholesale markets. This markets had specific farm catchment areas, and resulted in fragmentation of markets within the State, hindering the free flow of agro-commodities from one market area to another.

3.2. Historical Interventions in Agricultural Marketing

Over time, the range of agricultural produce and the quantity of production changed and these markets became bottlenecks to the movement of produce. The markets became opportunistic trading platforms under control of a few and were rendered restrictive and monopolistic, falling well below the intended objectives. Further, the existing regulatory framework does not support free flow of agricultural produce; and restrained the direct interface of farmers with the processors/exporters/bulk buyers/end users, and as such let in a large number of intermediaries who may or may not be adding any value along the value system. There arose multiple handling of agri-produce and multiple levels of mandi charges, which ended up escalating the prices for consumers without commensurate benefit to farmers.

Table 3.1 Major Policy Interventions in marketing

Year	Major Policy & Legislative interventions
1897	▪ Berar Cotton and Grain Market Act
1898	▪ Livestock Importation Act
1930	▪ Indian Sale of Goods Act
1937	▪ Agricultural Produce (Grading and Marking) Act
1938	▪ Rice Milling Industry (Regulation) Act
1947	▪ Rubber Board Act
1947	▪ Vegetable Oil Products (Control) Order
1950	▪ Zamindari Abolition Act

Year	Major Policy & Legislative interventions
1952	▪ Indian Standards Institutions Certification Marks Act
1952	▪ Forward Market Control (Regulation) Act
1954, 1964, 1976 & 1986	▪ Prevention of Food Adulteration (PFA) Act
1955	▪ Essential Commodities Act
1955, 1997	▪ Fruit Products Order
1956	▪ Sugar Control Order
1956	▪ Agricultural Produce (Development & Warehousing) Corporations Act
1957	▪ Wheat Roller Flour Mill Licensing and Control Order
1958	▪ Trade and Merchandise Marks Act
1958	▪ Standards of Weights and Measures Act
1959	▪ Sugar (Movement Control) Order
1959	▪ Sugarcane (Press-Mud-Control) Order
1960s & 1970s	▪ Intensive Agricultural District (IADP, 1964) & Area Programme (IAAP, 1965); Agricultural Produce Marketing (Regulation) Act
1962	▪ Warehousing Corporations Act
1962	▪ National Cooperative Development Corporation Act
1963	▪ Gur (Movement Control) Order
1963	▪ Export (Quality Control & Inspection) Act
1964	▪ Food Corporation of India Act
1964, 1980	▪ Cold Storage Order (under EC Act, repealed in 1997)
1965	▪ National Dairy Development Board Act
1965	▪ Fruit Products Order (FPO)
1965	▪ Agricultural Prices Commission (renamed CACP in 1985)
1966	▪ Sugarcane (Control) Order
1967	▪ Solvent Extracted Oil, De-oiled Meal and Edible Flour (Control) Order
1969	▪ Monopolies and Restrictive Trade Practices Act
1970	▪ Cotton Corporation of India Act
1970	▪ Sugar (Packing and Marketing) Order
1971	▪ Jute Corporation of India Act
1972	▪ Sugar (Restriction on Movement) Order
1973	▪ Meat Food Products Order
1975	▪ Tobacco Board Act
1975	▪ Packaged Commodities Order
1975	▪ Vegetable Oil Products (Standards of Quality) Order
1977	▪ Vegetable Oil Products (Control) Order
1977	▪ Pulses, Edible Oilseeds and Edible Oils (storage control) Order
1979	▪ Levy Sugar Supply (Control) Order

Year	Major Policy & Legislative interventions
1980	▪ Prevention of Black Marketing and Maintenance of Supplies of Essential Commodities Act
1982	▪ North Eastern Regional Agricultural Marketing Corporation (NERAMAC) Act
1984	▪ National Horticulture Board Act
1985	▪ Agricultural and Processed Food Products Export Authority Act
1986	▪ Spices Board Act
1986	▪ Bureau of Indian Standards (BIS)
1986, 1991, 1993 & 2002	▪ Consumer Protection Act
1986	▪ Cotton (Control) Order
1992	▪ Milk and Milk Product Order (MMPO)
1997	▪ Standards of Weights and Measures (packed goods) Act
2000	▪ National Agricultural Policy (NAP)
2000	▪ Jute and Jute Textiles (Control) Order
2000	▪ National Agricultural Policy (NAP)
2003	▪ Model Agricultural Produce Marketing (Development & Regulation) Act
2004	▪ Ban on futures trading of 54 commodities (including, rice, wheat, oilseeds, pulses) were removed. ▪ Processed food items exempted from licensing under Industries (Development & Regulations) Act 1951, except those reserved for small scale industries (SSI) and alcoholic beverages. ▪ Food processing & cold-chain added to list of priority sector for bank lending. ▪ Automatic approval for FDI upto 100% for most processed foods, except alcohol and beer and those reserved for SSI.
2006	▪ Food Safety and Standards Act
2007	▪ National Policy for Farmers (NAF)
2007	▪ Warehousing (Development and Regulation) Act
2013	▪ National Food Security Act
2014	▪ Schemes for commercial horticulture development subsumed into Mission for Integrated Development for Horticulture (Baagvani Mission)
2016	▪ National Agriculture Market (e-NAM) launched ▪ 100% FDI in marketing of food products produced & manufactured in India
2017	▪ Model Agricultural Produce & Livestock Marketing (Promotion & Facilitation) Act

Above list identifies the broad measures taken by the government over more than a century to in regards to agricultural produce and product marketing, to build the market structure as it exists today.

Before the phase of economic liberalisation in 1991, the government support was robust in terms of infrastructure and market support. The advent of economic liberalisation was expected to lead to the liberalisation in the agricultural marketing system as well and release the spirit of enterprise in the agriculture sector. However, the expected benefits of an increasingly liberalised national environment did not manifest in the agricultural marketing arena.

The agriculture sector did not witness much of new ideas and the APMC controlled marketing mechanism continued.

3.3. Operation Flood

In the dairy sector, the setting up of National Dairy Development Board in 1965 was the precursor to Operation Flood. India is today the largest producer and consumer of dairy and in the year 2015-16, milk production is cross 155 million tons. The market size was assessed at US$ 70 Bn in 2014-15, of which the organised formal sector was sized at about US$ 12 Bn.

Table 3.2 Milk Production and share in market channels

	Production (tons per day)	Market channel % share of production
Milk Production daily	4,26,000	100
Consumed in production areas	1,96,000	46
Surplus sold from production areas	2,30,000	54
Surplus handled by formal sector	1,41,600	33
Surplus handled by informal sector	88,400	21

After local consumption, about 54 per cent of the production is the surplus that is marketed outside the production area. About 33 per cent of the milk production (62 per cent of the surplus), is channelled to consumers through the small and informal sector such as local sweet shops and other retail. The organised formal market channels, operated by large scale processors through Cooperatives and Private enterprises, handles about 21 per cent of the total production (38 per cent of surplus). The National Action Plan for Dairy Development is targeting 300 million tonnes of milk production with 50 per cent channelled through the organised formal sector by 2023-24.

3.4. Market Support by Government

India's main policy goals remained with focus to attain food self-sufficiency, to ensure remunerative prices to farmers, and to maintain stable prices for consumers. To meet these goals, India continues to rely on a number of policy instruments:

- regulation of markets,
- input subsidies for producers,
- minimum support prices (MSP), and
- food subsidies for consumers.

3.4.1. Regulation of markets

The Agricultural Produce Market Committee (APMC) Act requires that farm produce be sold only at regulated markets through registered intermediaries. The Essential Commodities Act (ECA), allows central and state governments to place restrictions on the storage and movement of commodities deemed essential by governments. Notwithstanding moves to deregulate, fragmented market players continue to dominate the industry. The transportation, marketing and distribution of agri-food commodities did not develop in a scientific manner, linked or directly linked to demand from growing markets and the demand for what was earlier an essential commodity has also undergone changes.

3.4.2. Input subsidies

The starting point of Indian agriculture and concerns on food insecurity, necessitated provision of subsidies on fertilizer, electricity, fuel and irrigation. Intensive farming and production growth were motivators for policy interventions.

Prices of both domestic and imported fertilisers are subsidised and in most states, electricity is provided to agriculture at very low prices or free, among other support which led to distorting demand and the response from farmers. Prior assessment of soil health, or impact of unfettered irrigation on the agricultural environment had not been part of regular planning. Excessive use of subsidised inputs, rising soil salinity and ground water depletion are some of the resulting concerns. When these inputs result in outputs that do not find associated demand, the outcome is discontent.

3.4.3. Minimum support prices

Price Policy of the Government is an important instrument in the marketing arena. The Government of India (GoI) supports producers by announcing minimum prices for certain commodities considered key to its agriculture. The MSP are set on recommendations of the Commission for Agricultural Costs and Prices (CACP), based on cost of production and other factors. The MSP mechanism has recently been extensively evaluated for its efficacy[10] by the NITI Aayog in 2016.

There are other associated schemes such as the Price Stabilisation Scheme and Market Intervention Scheme that also come into play as minimum support systems for farmers. At one level, these support programs act as demand influencers, on the other these are measures to protect farmers from unrequited farming efforts. Conversely, the procurement made to mitigate fluctuations in farm-gate prices, are at times reactive to the retail prices at the consumer end.

3.4.4. Food subsidies

India has enacted the National Food Security Act 2013, to protect and assure low income consumers of access to affordable food. The Food Corporation of India (FCI) and other Govt. and State agencies procure food grains from farmers at the MSPs and sells at subsidised prices

[10] Evaluation Report on Efficacy of Minimum Support Prices (MSP) on Farmers, NITI Aayog - 2016

through the public distribution system (PDS). MSP linked benefits have been realised largely in areas where such MSP associated procurement happens and has tended to contribute to higher production and pressures to raise MSPs every few years. Food subsidy expenditures have almost trebled in the past decade.

3.5. First Steps towards Liberalisation

After 10 years of opening up the Indian economy and in the beginning of the new millennia the first seeds of agricultural reforms was sown.

3.5.1. Liberalisation of Control Orders

Stock limits in respects of essential agricultural commodities are imposed through Control Orders issued under the provisions of the Essential Commodities Act, 1955 by the States from time to time. With effect from 15 February 2002, the Government of India removed 11 classes of commodities in full and one in part from the list of essential commodities declared earlier. The Government issued the Removal of Licensing requirements, Stock limits and Movement Restrictions on Specified Foodstuffs Order, 2002 on 15 February 2002 allowing dealers to freely buy, stock, sell, transport, distribute, dispose, etc., any quantity in respect of wheat, paddy/rice, coarse grains, sugar, edible oilseeds and edible oils, without requiring any license or permit under any order issued under the Act.

In order to facilitate free flow of market forces and for the overall benefit of consumers, two more commodities have also been deleted from the list with effect from 31 March 2004. At present the list of essential commodities contains 15 items.

In the context of ongoing liberalisation of Indian economy, a rationalising and progressive dismantling of the system of control and restriction in the agricultural economy is warranted.

There is need to differentiate the stock held for captive end-use viz the inventory held for opportunistic market arbitrage (not having their own end-use). At the first instance, there is need to differentiate the genuine requirement of inventory by the food/agro-processing industry and food retail chains. Given the operating cycles of these stakeholders, the required inventory-turns to assure their business can be assessed and immediately permitted. Normally inventory is held to de-risk from input supply disruptions and is a factor of the type of product (safe holding life) and operating capacity of these captive users/stakeholders.

Similarly, the stock limit on exporters can be eased so that their secondary market connectivity is not effected. A multiple of the weighted average of the annual trade by such actors can be the starting point to rationalise and eventually remove the stock limits for more commodities.

3.5.2. Model APMC Act 2003 and Rules 2007

In 2003, the Department of Agriculture, Cooperation & Farmers' Welfare (DAC&FW) formulated a Model Agricultural Produce Marketing (Development and Regulation) Act, followed by Model Rules 2007 for the States/UTs to adopt. These were intended to usher in

the desired reforms in the erstwhile APMR Acts, to induce commensurate private investment in agricultural marketing. However, many States carried out partial reforms only, on a pick-and-choose basis, thereby defeating the objective of creating a uniform trade environment across the country.

As a result, there was no noticeable ground level progress and all desired results were not forthcoming. Nevertheless, on the evolutionary chart, they did help to open the shut doors to alternative marketing channels in some progressive States. However, even thereafter, the necessary changes in the agricultural marketing system did not happen as was expected. The reforms as adopted by the state governments has been largely ineffective. One of the reasons appears to be depriving private markets a level playing field.

3.6. Some notable changes in the marketing system

It would not be complete to review the existing marketing system without mention of emergence of changed marketing situation in some of the States in the country. Alongside, the evolution of regulated markets, some alternative marketing systems have developed. Alternative marketing systems such as cooperative marketing, contract farming, retail chain linkages etc., got an impetus in the aftermath of the first level of marketing reforms. Alternative marketing systems provide other marketing platforms for farmers to sell their produce.

3.6.1. Direct Marketing

Direct marketing in the context of agricultural marketing, where farmers directly transact with the produce consumers. These operates in two basic formats (i) Farmers' Markets, and (ii) Direct sourcing from farmer's field by processors (primary consumers).

These markets are proven to be beneficial to both producers and consumers. These markets have helped in mitigating the problems of fragmented supply chain. Further, the quick movement of produce from farmer to consumer, saves losses considerably. In these markets no market fee is charged but service charges are collected from sellers. About 488 such farmers' markets are operating in different States in the name of *Apnamandis* in Punjab, Haryana, *Rythu* bazaars in Andhra Pradesh and Telangana, *Uzhavar Sandhai* in Tamil Nadu, *Shetkari Bazaars* in Maharashtra and *Raitha Santhe* in Karnataka. As per a study[11] on these bazaars it is revealed that the producer's share in the consumer's rupee and marketing efficiency was more in case of *Rythu* bazars (Farmers' market in Guntur) when compared to organised retail outlets and the least was in case of hawkers and petty vegetable enterprises.

However, footfall is limited to the local consumer and therefore future growth is limited. Any production that is in surplus to the absorption capacity in the market region requires physical connectivity with demand that is further afield.

The other variant of direct marketing is by way of direct sourcing of the produce from farm-

[11] Rao *et al* (2013)

gate by the processors, exporters, retail chain players, etc. Direct marketing and direct sourcing allows farmers to skip multiple layers in their transactions and benefits by skipping of intermediary margins. Though recommended in the Model APMC Act & Rules, very few of States have issued such licenses for direct sourcing.

Figure 3.1 State-wise licenses issued for Direct Marketing

SN.	Name of State	No. of Direct purchase licences issued
1.	Maharashtra	219
2.	Gujarat	03
3.	Karnataka	37
4.	Rajasthan	03
5.	Madhya Pradesh	01
6.	Andhra Pradesh	02
7.	Telangana	03
8.	Himachal Pradesh	12
9.	Punjab	11
10.	J&K	03

Direct sourcing can manifest as contract farming instruments.

3.6.2. Contract farming

Contract farming can address many traditional ills, such as lack of market connectivity, long chain of market intermediaries, ignorance about the buyer demands, etc. Contracts from bulk consumers can serve to offer regular and consolidated demand to farmers and an assured exchange against predetermined quality and quantity. This allows farmers to vertically integrate with specific and organised market channels.

Figure 3.2 State-wise progress of Contract Farming

State	Crops under Contract Farming	No. of Companies under CF
Punjab	Malting Barley	1
Haryana	Barley, Basmati, Ordinary Paddy, Potato	4
Chhattisgarh	Bitter Gourd, Bean, Green Chili, Tomato, Lady finger, Bottle gourd, cucumber	2
Gujarat	Cotton	1
M.P	Cotton	1
Maharashtra	Sponge/Ridge gourd, Lady finger, Chili, Tomato, White Onion, Potato, Baby corn, Soybean, Beans, Pomegranate, Sweet corn	5
Karnataka	Organic Cotton	1

DAC&FW through model Act, 2003 suggested that States promote contract farming and by now 20 States provided contract farming provision in their APMC Acts while Punjab legislated a separate Contract Farming Act in 2013. So far, 14 States only have notified the Rules to

actualize the contract farming on the ground level and only States of Maharashtra, Haryana, Punjab, Karnataka, Gujarat, M.P and Chhattisgarh have registered companies/ firms for undertaking contract farming in their States.

Contract farming is frequently extended to non-crop activities also. Poultry farmers for both eggs and broilers function under large enterprises in many States of the country particularly Tamil Nadu, Kerala, Karnataka and Andhra Pradesh. Of late, most of the food processing units have shown keen interest to enter into some form of contracted supply for their feedstock from producers.

The reasons identified for this slow progress include (i) conflict of interest perceived by APMCs/Marketing Boards which are designated as the registering, agreement recording and dispute settlement authorities in most of the States; (ii) complex and long procedures for registration and recording of agreement; (iii) provisions of stockholding limit under Control Orders issued at any point of time deters buyers to enter into contracts to aggregate the contracted produce, even for the intended purpose of processing, exporting, linking to retail chain; and (iv) poor publicity of contract farming among the farmers about its benefits.

Several studies reveal that contract farming is a mode of marketing that can marry small farmer efficiency to large scale of economy of processors. The vertical integration promotes transfer of management skills to the field, provides assured buyers for the produce, reduces risks from unplanned transaction and opens avenues for institutional credit.

Contract farming has a constraint from farmers' perspective, in that they are limited in their production to the direct demand and their growth is linked to the contractor's capacity to grow the market share. Further, large processors have option to source globally, depending on cost efficiency and quality requirements.

The opening of markets will however, help farmers decide on the optimal market opportunity, contracted or other wholesale. Though contract farming is not a sole solution for problems in agricultural marketing, it can very well be leveraged in certain regions and for specific crops for increasing farmers' income.

3.6.3. Private wholesale markets

So far 21 States/UT have made enabling provisions for setting up of such markets and only 11 States have notified the rules thereunder to implement the provision. Various restrictive and hindering stipulations in the amendments like permitting one limited crops for trading in private market, prescribing certain distance from existing Mandi to set up private market, exorbitant licence fee for setting up of such market and more importantly asking such licensee to collect market fee at applicable rate and pass on the same to the Mandi Board are proving deterrent to come up private markets.

States need to liberalise the marketing regulations to promote development of private markets

and not doing so hinders the intended reforms and dilutes the desired impact.

Figure 3.3 State-wise progress of private market

SN	Name of State	No. of Private Market licences issued
1.	Maharashtra	43
2.	Gujarat	27
3.	Rajasthan	09
4.	Karnataka	03

3.6.4. Organised retailing

Retail is the last mile connect with end-consumers, either food or for non-food items. The food and agro-processor have a forward distribution channel for their retail needs and their enterprise level marketing is handled by individual processor and brand owners. In the fresh food segment, consumers are predominantly linked through small and fragmented retail merchandising (small grocers and street hawkers). However, the example of SAFAL (the fruit & vegetable marketing subsidiary of Mother Dairy) is mentioned as an example of indigenously organised retailing network. SAFAL operates in Delhi out of approximately 400 retail outlets, and sells about 350 tonnes of fresh produce daily in Delhi-NCR markets.

Such front-end organisation has reflected in daily supply from almost 180 farmers associations (comprising about 8000 farmers), as well from other wholesale markets. Effectively, the consolidated demand from their small format outlets generates more than 110,000 tonnes of annual demand for fresh produce, from farms in States adjoining Delhi, and another 15,000 tonnes coming from existing wholesale markets.

The farms, through farmer associations, directly transact with SAFAL to supply the required produce. This model does not involve any contractual arrangements, but is a form of need based collaboration, with farmers free to sell their produce to other agencies. However, the arrangement creates long term mutual interest. Most importantly, though the produce basket keeps changing across seasons, the sustained demand has allowed the linked farmers association to take up farm-gate activities including transport management, till SAFAL receiving centres in Delhi. This has brought value gains to the farmers.

The growth in scale of private operators in food retail sector is also visible. Many Indian companies have organised the supply chain locally, from farm sources, for their own retailing requirements. Some traditional wholesalers at terminal markets have also organised and initiated joint ventures with global majors to get access to capital and to gain expertise in supply chain management. Organised retail of agricultural produce is not only growing from fixed format outlets, but has also shown a spurt in the online space. Increasingly, there are many enterprises that are marketing fruits, vegetables, meats, fish and others from online platforms. Most of these have developed on the back of entrepreneurial spirit that saw opportunity in the

existing inefficiencies in food supply systems.

3.6.5. Farmer producer organisations (FPOs)

There is a need to aggregate farmers in order to offset fragmentation in land holding and bring benefits of economies of scale. Organising producers into formal management practices help to initiate collective decisions on cultivation to make the best use of market intelligence, as well creates opportunities for producers to get involved in value adding decisions and activities such as input supply, credit, pre-conditioning, processing, marketing and distribution. The aggregation of farmer into FPOs (cooperatives/SHGs/FIGs/Producer company), aid their integration into the supply chain, and in taking up roles traditionally by market intermediaries.

Government of India issued guidelines to encourage states to directly support FPO promotion as a regular activity under various Schemes including RKVY during the XII Plan. These guidelines are meant to help the states follow a standard methodology for FPO promotion, as well as to provide indicative costs and a monitoring framework. States may directly engage promoters to mobilize the small farmers. Alternatively, SFAC is empanelling suitable Resource Institutions (RIs) on their behalf.

The instrument of Farmer Producer Company (FPC), registered under Companies Act is emerging to be effective. FPCs offer a wide range of benefits compared to other formats of aggregation of the farmers. FPC members are able to leverage collective strength and bargaining power to access financial and non-financial inputs and services and appropriate technologies leading to reduction in transaction costs. Members can also collectively tap high value markets and enter into partnerships with private entities on equitable terms.

FPCs have performed well in states like Maharashtra, Madhya Pradesh and Kerala and farmers have been able to realise higher returns for their produce. Most of the FPOs remain focused on addressing issues of crop planning, technology infusion, input supply and primary marketing. However, it is expected that more would expand their roles further up the value chain, entering into post-harvest management, transport, storage and value added processing and engage in contract production of primary agricultural produce.

3.6.6. Cooperatives in agricultural marketing

Cooperatives were recognized as one of the means to aggregate farmers for establishing scale in their production and marketing activities, besides easing access to credit and other services. Cooperatives have achieved limited success over the years except those in the States like Maharashtra and Gujarat. Notable examples are in the dairy sector (GCMMF-AMUL) and in grapes (MAHAGRAPES) where collective operation has resulted in the reduction of transaction costs and improved the bargaining power of smallholders' vis-à-vis foreign traders.

3.6.7. Food & agro-processing

Historically, agriculture and food processing industries remained stagnant due to low public investment, poor infrastructure, inadequate credit availability and high levels of fragmentation.

A number of reform measures have been taken to promote investment in the sector, including in the logistics for supporting the supply chain from processor to consumer. Most of the food processing enterprises have been exempted from the provisions of the Industries (Development and Regulation) Act, 1951 (except beer and alcoholic drinks, and items reserved for the small-scale sector). For foreign investment, automatic approval is given for up to 100 per cent equity for a majority of processed foods.

Apart from infrastructure constraints, the food processors face problems in procurement of raw materials for processing due to restrictive provisions of the regulated markets. An issue often highlighted by food processers is the variation in the operation of the APMC Act in different states. Most states require food processors to register for direct marketing with the respective marketing committee at multiple locations, but some states allow single point registration. Some states exempt food processors from paying mandi tax on agricultural produce purchased for inputs in other states; other states charge mandi tax at the point of consumption.

Another major constraint faced by food processors is the lack of availability of processing variety crops, especially for fruits and vegetables. This is primarily due to the inadequate extension and linkage between production and processing. For this, the concerned departments, such as processing, agriculture and horticulture could have a joint marketing cell to share the demand and qualitative requirements of the processing industry. This will bring about demand-driven production perspective in the sector. The industry has specific requirements on crop types, food safety aspects and practices at farms. The marketing system would contribute through upstream communication to farmers, such that appropriate supply and vertical integration with processors is made an option. The industry plays a vital role in employment generation and provides an assured demand to farmers, against predetermined quality parameters. It can also, for its competitive benefit, market its demand to domestic farmers.

The food and agro-processing units are important mode for farmers to monetise their produce. The output from these units will benefit from supply side analytics. Global availability of commodities used as feedstock by the industry, as well as local supply side information for processing is important if vertically integrated farming is to be promoted by the production departments.

3.7. Challenges to Agricultural Marketing

There continue to remain challenges to agricultural marketing, despite various positive initiatives, and these are frequently debated. The most recent assessment was by the "Committee of State Ministers, in charge of Agriculture Marketing to Promote Reforms", the report released in January 2013. The Committee highlighted that agricultural marketing is posed challenges due to fragmented supply chain with inadequate marketing infrastructure, long intermediation and lack of accurate and timely market information/intelligence system.

Various aspects of supply chain infrastructure are discussed in volume III of this report. The output supply chain benefits from market intelligence, to plan and adjust supply to markets

depending on demand projections, making the operations more relevant and efficient. Therefore, a challenge is also to map shifts in demand over time and provide timely information, for supply side to make adjustments in advance to their planned activities. The Committee of States Ministers reported challenges, extracted here[12]:

(i) **Limited access of agricultural produce markets*:*** There is huge variation in the density of regulated markets across the country, varying from 118 sq km. in Punjab to 11,214 sq km. in Meghalaya.

(ii) **Licensing barriers*:*** The compulsory requirement of owning a shop/godown for licensing of commission agents/traders in the regulated markets has led to the monopoly of these licensed traders and a major entry barrier for new entrepreneurs, preventing competition. Many market yards established long back, do not even have space for construction of added shops, godowns, etc. The traders, commission agents and other functionaries organise into associations, which generally does not allow easy entry to new persons, stifling the very spirit of competitive functioning. The system of licensing is quite restrictive and has outlived its utility and there is need to remove barriers to revitalise the present marketing configurations.

(iii) **Lack of Market Infrastructure in Agricultural Markets*:*** Studies indicate that covered and open auction platforms exist only in two-thirds of the regulated markets, while only one-fourth of the markets have common drying yards. Cold storage units exist in less than one tenth of the markets and grading facilities in less than one-third of the markets. Electronic weigh-bridges are available only in a few markets.

(iv) **High Incidence of Market Charges*:*** APMCs are authorized to collect market fee ranging between 0.50 to 2.0 per cent of the sale value of the produce. In addition, commission charges vary from 1 to 2.5 per cent in foodgrains and 4 to 8 per cent in fruits and vegetables. Further, other charges, such as, purchase tax, weighment charges and hamal charges are also required to be paid. In some States, this works out to total charges of about 15 per cent which is excessive.

(v) **High Wastages in Supply Chain*:*** Study conducted by ICAR (2010) shows that the post-harvest losses of various commodities range from 3.9-6.0 per cent for cereals, 4.3-6.1 per cent for pulses, 5.8-18.0 per cent for fruits and 6.8-12.4 per cent for vegetables. The total post-harvest losses of agriculture commodities have been estimated at about Rs 44,000 crores at 2009 wholesale prices.

(vi) **Long Gestation Period of Infrastructure Projects and Seasonality of Agri. Produce:** Agriculture marketing infrastructure projects have a long gestation period. The seasonality and aggregation of small surpluses of agricultural produce further affect the economic viability of the projects, which deters investments. There is a strong need of Viability Gap Funding/subsidy and easy availability of finance to attract investment for such projects and also easy availability of concessional funding to attract investment

[12] Extracted from report of the Committee of State Ministers, in charge of Agriculture Marketing to Promote Reforms, 2013

for marketing infrastructure projects.

(vii) **Lack of national integrated market*:*** Under the present system, the marketable surplus of one area moves out to consumption centres through a network of middlemen and traders, multiple market areas and institutional agencies. Although, there exists a national level physical market, there is no national level regulation for the same and the existing regulation does not provide for a barrier free market in the country. Therefore, there is a need to develop a national single market for agricultural commodities by removing all the existing barriers of licensing, movement and storage.

(viii) **Less farmers' price realisation*:*** The share of farmer in consumer's price is very low particularly in perishables due to a number of intermediaries, lack of infrastructure and poor holding capacity. In order to provide remunerative prices to the farmers, there is a need to reduce intermediation by providing alternative marketing channels like direct marketing, contract farming, etc. for which reforms in agricultural marketing system are necessary.

(ix) **Large number of marketing channels with long supply chain*:*** Traditionally, the normal agricultural marketing chain in the country is fairly long with a large number of intermediaries between the producers and the consumers, adding up more of costs without adding significant value.

(x) **High marketing cost affects small and marginal farmers*:*** High marketing costs have direct bearing on the efficiency of marketing of agricultural produce. This affects the actual price realisation particularly by the Small and Marginal farmers in the country owing to their lower marketable surplus, higher transaction.

To address these concerns and others, the Department of Agriculture Cooperation & Farmers' Welfare formulated recommendations known as the Model Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act, 2017, which incorporates various changes to reflect the agenda of a unified national market for agriculture, besides facilitating alternate market channels, including opening up the system to private sector as well for alternate online marketing platform.

3.8. Need for next Level of Reforms

Agriculture like any other enterprise, is sustained only when it generates net positive returns to the producer. A market is a place, where goods are monetised, and price per unit is determined, to result in the total value that a farmer-producer fetches. Value is linked to final demand, in qualitative and quantitative terms and the markets are also a medium to connect to such demand. Therefore, the interconnectivity of agricultural markets and the marketing efficiency are critical to the overall value system.

The country has undergone a phase of liberalisation in the banking, industrial and services sectors. That has made these domains more competitive and responsive to market demand. However, the agriculture including marketing has been bypassed a similar liberalisation. Instead, a more knee jerk response in policy terms is evident, where market dynamics are

coloured with the earlier protectionist perspectives. The best protection to farmers is in promoting long term market linkages, such that markets are connected across place, time and form with farms.

The necessary condition for transferring remunerative prices to the farmers is a competitive environment that facilitates fair and transparent price discovery. Current times, are largely one of marketable surpluses, through there remain certain sectors like oil seeds that face severe deficit despite ongoing demand. This situation is conducive to play of market forces, the only condition being that no monopoly practices are supported. However, the common perception as it stands today, is the inevitability of higher administered prices and government procurements. Given the probability of an agriculture marketing structure not to remain perfect or ideal in real situation, the support by way of MSP and procurement would be necessary and therefore remain relevant. However, in the opinion of the Committee, given the improving levels of production, extent and quality of infrastructure, including agri-logistics, market forces can be deployed to play a more important role than hitherto.

The support by the Government for the welfare of farmers, needs to be rationalised such that the desired outcome is the immediate wellbeing as well as developing the long term self-sufficiency of the agricultural eco-system. The policies need a reoriented direction, such that agriculture does not acquire the characteristics of a public sector, but adopts an enterprise approach. Unplanned and continued subsidising of input and outputs have contributed to fiscal deficits and does not take the country's agriculture on a growth track. Agriculture has reached a stage where is to be viewed a commercial activity.

Cultivation has been regular recipient of ongoing and able support, through extension and technology transfer. There will remain the need to continue support to cultivation and improve technology transfer to farms. The input support to farmers are discussed in later volumes of this report. However, the farmer is in acute distress when his/her surplus of produce is unable to link with a market and/or realise equitable value. The breakdown arises from subsequent inability to fully monetise the surplus production. Performance of the agricultural marketing system is directly reflected in the distress of the farmer. Immediate revisiting of the strategies behind the agricultural marketing system is needed.

The erstwhile marketing system, served well the original agenda to incentivise the farmers to ramp up production, for meeting food security requirements. At a time of deficit, it was necessary to regulate and monitor the production and control the flow of food across the country. It was once normal practice for the government to regulate the supply of cement and rubber, when these commodities were in deficit, but these controls were done away with, once the supply side was developed, and market was freed to function in a competitive environment.

A similar and phased opening up of the agricultural marketing system is warranted, especially when large marketable surplus of agricultural produce is being generated, yet the quantities find unbalanced supply into the markets. The basket of agricultural produce has expanded and

policies need no longer be limited to wheat and rice. In all, the country's farms produce far more than one billion tonnes of agricultural produce.

Agriculture now displays a cosmopolitan profile, with a high level of output from horticulture, dairying, poultry and fisheries, besides the customary produce like cotton, sugar cane, cereals, pulses and oilseeds, etc. The existing marketing system requires to adapt to and become future ready. New reforms in marketing are urgently needed as we close the second decade of the new millennium.

Greater reforms in the agricultural marketing system to the farmers' benefit is stressed upon.

3.9. Next step in reforms

Between 2003 and 2016 the agricultural marketing environment did not undergo any desired level of changes to the benefit of farmers. The quantum of produce captured at APMC markets, upgradation of markets or the development of new markets were not satisfactory. The various aspects of the slow progress are discussed earlier in this chapter.

Despite surpluses in various commodities, the deficit in pulses and oilseeds remained or got aggravated. After the first step of reforms, not much was realised in substance and the APMC monopoly continued and a level playing field was into provide.

Keeping in mind the limited adoption of the first step towards reforming the marketing system, the changed dynamics in the business eco-system, as well as technological advancements, the government has already introduced the next steps to correct certain imbalances. Next stream of reforms needed.

The unified National Agricultural Market and the model APLM Act, 2017 are the precursors to further reforms in the agricultural marketing system

3.9.1. National Agriculture Market

The classical agricultural marketing studies, advocate market integration over space and time, as basic to marketing efficiency today the agricultural marketing across the country has been divided and fragmented into a large number of APMCs, which restrict the movement of commodities beyond their notified geographical area. While this compromise market efficiency over space, absence of warehousing and other pertinent facilities like pledge loan dilute the marketing efficiency over time. This understanding, paved the way for the government to initiate market integration across the country.

The government introduced a Central Sector Scheme for promotion of a National Agricultural Market (NAM) to bring about a transformation in agriculture marketing environment. A unified market can be best realised through a pan-India electronic platform which can facilitate the participation of buyers and sellers from all over the country. The e-NAM network was inaugurated on 14-April-2016 and by March of 2018, a total of 585 markets are expected to be

on the e-NAM platform.

As of May 2017, 419 regulated markets from 13 states have been integrated into the scheme and 42.18 lakh farmers and 89,199 traders have been registered on e-NAM portal with a turnover of Rs 16, 163.1 crore from the trading of 63.17 lakh tonne produce.

Under this scheme, the key enablers to operationalise a pan India electronic platform are provision for e-auction, material accounting, trade fulfilment, fund processing and post-sale document creation (like generation of e-bills) which would increase efficiency of intermediation. Generating e-permits for all transactions conducted on the platform would create an audit trail verifiable across the country and simplify movement of goods. Better price realisation for farmers will serve as an important incentive for raising productivity and production and in turn lead to higher growth of output. In many states, farm harvest prices prevail at sub-optimal price and e-NAM will help check such market imperfections.

Some key features that an NAM must have to realise the intended potential are:

- Auction of the produce takes place simultaneously in the same electronic platform in all regulated markets (APMC markets) in the country, as well as private markets, as and when they come to be established.
- Every regulated market is supported by infrastructure for quality assaying of the produce. Harmonised standards & grades are accepted across markets, to allow seamless trade across platforms.
- Collection of sale proceeds from the buyer and remitting it to the bank account of the seller is facilitated by the market.
- Restrictions in transportation of the commodity are removed. A buyer, irrespective of his location, can participate in any market of choice. The required agri-logistics infrastructure for storage and transportation is put in place.
- The institution of agency to support inter-mandi trade, as also the dispute resolution mechanism are in place.

The fortuitous roll out of GST with effect from 1-July-2017 has given a fillip to achieving a single market. India is truly on the way to becoming a nation with one-tax and one-market.

Creating a true national agricultural market

The vision of a full-fledged national agricultural market, is where all types of markets have inter-operability in communication, standards, systems, operating under a common regulatory framework. This can happen when all markets, including alternate models of markets, established or notified as such under the provisions of the model APLM Act 2017, whether in private or public sector, come online and adopt a common electronic platform; for electronic alone has the capacity to transcend the barriers of physical space and integrate the geographically distributed multiplicity of markets.

A critical ingredient would be, to let as many markets and as many models of markets as possible to bloom under different ownership types. This allows for a liberalised and competitive environment. This entails that there may be more than one software system and these will require an interoperable architecture, built to open and commonly adopted IT system standards.

The way forward is that an online platform like e-NAM, would incorporate inter-operability and serve as a central platform for any number of e-platforms that may come up in the country. However, the virtual trade that online platforms promote, would be conditional upon certain parameters, these include -

i. Harmonised tradable parameters and standards for the produce
ii. Network of assaying laboratories and needed technical manpower
iii. Agri-logistics encompassing cleaning, grading, packaging, storage (dry & cold), transport (multi-modal, dry/cold)
iv. Services agencies to handle post-sale processes – aggregation, storage transportation as per conditions agreed upon
v. Dispute resolution mechanism, at the markets – district, state and national level
vi. Special Purpose Vehicle (SPV) at state and national level to set up, operate and manage the online trading

For this purpose, the Ministry of Agriculture & Farmer's Welfare may consider the need to appoint a dedicated advisor to monitor and evaluate the implementation of the e-NAM, at least over the next 3 to 5 years.

The SPV at the central level would work to ensure than the standards and specifications are in place for an inter-operable IT architecture. It will also work towards the harmonising of all applicable produce and product standards, to serve a unified national market.

A unified national agricultural market would require licensing of market functionaries stakeholders at the national level. For this purpose, the Committee suggests that the government may require adopting a Central Act, which will create a legal framework that will facilitate creation of a truly national unified agricultural market.

3.9.2. Firm push for robust reforms

In the context of less than desired market environment as brought out in the preceding sections, and the new focus on agriculture with particular emphasis on farmers' income and welfare, market reforms became the natural choice as core to the overall basket of agricultural reforms.

To initiate much needed changes, the Department of Agriculture, Co-operation & Farmers' Welfare constituted a Committee in September 2016 to formulate a model that would reflect

the current needs, as well as make the system future-ready. This initiative, along with a series of others, was in perfect harmony with the mandate of this Committee which was referenced to parallelly make necessary recommendations towards a strategy for doubling farmers' income. This Committee, therefore, provide inputs for reforms to be initiated in the marketing system, and brought out the Model Agricultural Produce and Livestock Marketing, (Promotion and Facilitation) Act, 2017. This Model Act was shared with all the states and union territories on 24-April-2017.

Model APLM Act, 2017

In 2017, Government of India have come up with the Model Agricultural Produce and Livestock Marketing, (Promotion and Facilitation) Act, 2017. As per New Model Agricultural Produce and Livestock Marketing (Promotion and Facilitation) Act, 2017, the new definition of market area restricting the power of the market committee to enforce regulation in the principal market yards and submarkets yards only, is something in tune with the concept of unified market for agricultural produce. This will go a long way towards removing the entry barriers and trade barriers in the agricultural marketing system of the country. This will also make marketing system more competitive by attracting new players and do away with the monopolistic and oligopolistic tendencies of the present players of the APMC markets.

The inclusion of Livestock in the title of the new Model Act is a step in the right direction. In some states the livestock and livestock products are not notified commodities. This will help in introducing good marketing practices in the livestock sector.

The new Model Act will end the monopoly of APMC by allowing more players to set up markets and create greater competition at the markets. The market fee caps under the new Model Act (including developmental and other charges) at not more than 1 per cent for fruit and vegetables, and 2 per cent for food grain. It caps commission agents' fee at not more than 2 per cent for non-perishables and 4 per cent for perishables. This will bring efficiency in supply chain and build a transparency in trade operations and an equitable environment for marketing. The new legislation will also have provision for promoting online or spot (e-national agriculture market) agriculture market platforms and ensure that all these measures are revenue neutral for States. The distinguishing features of the Model APLM Act, 2017 are:

(i) Abolition of fragmentation of market within the State/UT by removing the concept of notified market area in so far as enforcement of regulation by Agricultural Produce and Livestock Market Committee (APLMC) is concerned (State/UT level single market).

(ii) Full democratization of Market Committee and State/UT Marketing Board.

(iii) Disintermediation of food supply chain by integration of farmers with processors, exporters, bulk retailers and consumers

(iv) Clear demarcation of the powers and functions between Director of Agricultural Marketing and Managing Director of State/UT Agricultural Marketing Board with

the objective that the former will have to largely carry out regulatory functions, while the latter will be mandated with developmental responsibilities under the Act.

(v) Creation of a conducive environment for setting up and operating private wholesale market yards and farmer consumer market yards, so as to enhance competition among different markets and market players for the farmer's produce, to the advantage of the latter.

(vi) Promotion of direct interface between farmers and processors/ exporters/ bulk-buyers/ end users so as to reduce the price spread bringing advantage to both the producers & the consumers.

(vii) Enabling declaration of warehouses/ silos/ cold storages and other structures/ space as market sub-yard to provide better market access/ linkages to the farmers.

(viii) Giving freedom to the agriculturalists to sell their produce to the buyers and at the place & time of their choice, to whom so ever and wherever they get better prices.

(ix) Promotion of e-trading to enhance transparency in trade operations and integration of markets across geographies.

(x) Provisions for single point levy of market fee across the State and unified single trading licence to realise cost-effective transactions.

(xi) Promotion of national market for agriculture produce through provisioning of inter-state trading licence, grading and standardization and quality certification.

(xii) Rationalization of market fee & commission charges.

(xiii) Provision for Special Commodity Market yard(s) and Market yard(s) of National Importance (MNI).

(xiv) Providing a level playing field to the licensees of private market yard, private market sub-yard, electronic trading and direct marketing vis-à-vis the APLMCs and removing the conflict of interest that the latter are likely to practise, if both development and regulatory functions are centred in the same authority.

The Model APLM Act, 2017 provides a progressive and facilitative provision for the integration of processors, exporters, bulk buyers, end users, etc. with farmers. To overcome the conflict of interest and rationally paying a fraction of market fee, there is provision that Director of Agricultural Marketing will issue a license to such buyers and buyer will be liable to pay to Revolving Marketing Development Fund @ only 25 per cent of the applicable market fee. Apart from above, all other restrictive provisions have been removed.

The provisions made for private markets is with intent of "**ease of doing business**", as it provides for level playing field both for APMC market and private market. Under the new legislative model, APMC will not be the regulator of private markets and licensee of such markets can collect the user charges and retain with him, thus, making it an economically viable proposition.

The new definition of market area in the new Model Act, 2017, is in tune with the concept of unified market for agricultural produce. This will go a long way towards removing the entry barriers and trade barriers in the agricultural marketing system of the country. This will also make marketing system more competitive by attracting new players and do away with the monopolistic and oligopolistic tendencies of the players in the present APMC markets.

The provision for declaring warehouses / silos / cold storages or other such structure or place as market sub yards is made to provide better market access / linkages to farmers. This development will help integrate the warehouses / silos / cold storages etc., into the online e-platform. This, in turn, will help in facilitating operationalisation of warehouse receipt system and capturing of information for a responsive market information system.

The Model APLM Act, 2017 is a recommendation for the States to adopt, to initiate greater marketing changes in agriculture and to encourage a single national agriculture market.

3.9.3. Other reforms needed

In order that the Model Act is adopted by the States and UTs quickly, there need to be hand held by way of organising orientation and training besides. Further, to make the provisions of this Model Act operational, once adopted by the States an UTs, it is also important that the Ministry rolls out the Model Rules at the earliest.

The inadequacies in the provisions relating to contract farming have been elaborated previously in section 3.6. It is obvious, that contract farming can play a substantive role in de-risking the farmers. To facilitate the entering into a contract whereby pre-production purchase price is agreed upon, an independent and robust contract farming act is essential. Such an act should provide for an efficient system for management of both inputs and outputs and create a formula that promotes win-win situation for both parties. This will ensure sustainability and scale up. The common apprehension about contract farming is windfall gains that the promoting company may benefit of, and the unwillingness of the farmer to honour the agreement when it is inconvenient. It is therefore be necessary to incorporate safety-net provisions, for the farmers to also partake of any unexpected windfall gains due to any market buoyancy.

It is also important that an independent regulatory authority is brought in and remove the conflict of interest by disengaging the contract farming stakeholders from the existing APMCs. The core spirit of such an act should be to enable the small and marginal farmers to mobilise themselves into groups and operate scales of economy in partnership with an industry.

This Committee, as authorised by the Ministry is already working on the APML Market Rules and a model Contract Farming Act.

In recognition of the importance of warehousing as a promoter of optimal prices, and keeping in mind the time bound of doubling the farmers' income, this Committee is also working on guidelines to popularise the pledge loan and e-NWR based marketing.

3.10. Strategic Vision

The vision to capture value from every grain, every ounce and every drop, has to have a strategy that enables that all produce finds avenue to reach a point of value realisation. The value realised has to be demand linked and hence optimal, and not merely linked to cost of inputs.

For long, the general approach towards farmers has been to provide them a minimum price for their efforts. The recent National Commission for Farmers (NCF), also recommended that farmers be provided a minimum price linked to cost of their inputs. These past approaches to farmer's income were not market linked and instead were guided by the desire to offer farmers succour in the form of minimum support price. While this patrician approach may have some merit, this Committee felt there is need to have a more comprehensive approach - one that looks to the future and creates market led growth for the farmers.

Succour is a form of relief against the costs input, and will tend to restrict the farmers from growth opportunities that today's market generates. As established through the price dispersions and wedges in the system (see chapter 2), the minimum price is far below the final value that the produce generates. In the opinion of this Committee, the cost plus 30 per cent, or even 50 per cent as suggested by the NCF only complicates matters by strengthening focus on a minimum price structure, and pursuance of which, this Committee feels would be an injustice to the farmers. It would be wrong to presume that markets cannot be made efficient enough to provide much more than the floor price.

The need of the hour is to work towards bringing farmers the optimal value, linked to market prices, rather than a cost plus linked minimum price. There is no alternative to this approach, if farmers are to realise enhanced farm income. For this, the agricultural marketing system needs to have a new strategy, one that targets optimal prices to farmers. The strategy will be overlaid with three broad targets:

a. To enable an effective flow of farm produce to its point of value realisation through the means of efficient market networks.

b. To maintain a holistic value based system approach, and hence provide relevant market intelligence to direct the flow of produce.

c. To match demand with supply so that producers fetch optimal value for their produce rather than seeking a minimal value.

However, markets have multiple variables and are influenced by demand and supply dynamics that can even be global in nature. There are therefore, no ideal or perfect markets and hence there will remain the need, as explained earlier, for government intervention, from time to time.

In sum, the government would remain an active and robust player in the agricultural market environment. The government's intervention should however, not result in disruption of the market environment but should only aim to safeguard the country's food and nutritional security, and as well allow for economic growth to farmers.

3.11. Annotation

In many areas of the country, a situation of surplus is frequently witnessed. The time has come to develop competitiveness in the marketing system, to open the stage to more players, who will compete to source the production and take advantage of the large consumption demand across the country.

The country needs to be careful that events do not lead to the agriculture to develop character of a public sector but constructively advance an enterprise approach towards agriculture. Enterprise approach will require supporting farm to market connectivity and linkage with demand information through changes in the way institutional support is directed. Further interventions in agriculture productivity, must aim to make marketing equally productive while optimising resource use during cultivation.

The marketing system has to provide farming enterprises market information in advance to crop planning, as well as enable a choice of market channels. Such directional change should aim at long term reduction in cost based support systems to move towards support that makes the farmers more effective in responding to market demands. Systemic reforms can lead to the establishment of an effective agricultural marketing system, and eventually also lead to the complete deregulation, at least in the domestic market, in the coming decade.

Key Extracts

- Growth in farmer's income is intrinsically linked to marketing of their harvested produce, besides other input reforms.
- India's agricultural marketing policies have undergone frequent changes but still carry the legacy of a past closed economy.
- The past liberalisation in the industry and service sector has not been implemented in the agricultural marketing sector.
- Fundamental reforms are needed in agricultural marketing to bring competition by attracting new players, replacing monopolistic environment.
- The evolution in the marketing policies, with production in focus, have not promoted a participatory market environment but led to subsidy linked production.
- Government support in agricultural marketing must match its ongoing support through procurement, which on its own can disrupt the natural forces of the market.
- New generation reforms must supplement and complement the changes under GST and to promote the concept of a single national market.

Chapter 4

Capture every Grain, every Ounce & every Drop

A comprehensive revisit of marketing polices with an approach to make interventions predictable and aligned with market dynamic is needed. This will also require greater participation of private sector.

The past experience and the constraints mentioned in the previous chapters call for a changed and comprehensive approach to address the formidable issues of agricultural marketing in India. The strategic approach would need to aim at a holistic marketing solutions so as to bring optimal value to the farmers, which is linked to market price rather than minimum price, and a changed architecture to open channels that can capture all the marketed surpluses.

4.1. Administered price versus Market price

This Committee for Doubling Farmers' Income (DFI) realises the importance of setting floor prices of various produce types, as it established the minimum support price. Originally, the price support was indicated by notifying a minimal floor price for specific produce. A separate price was used for direct procurement by FCI, which used to be higher than the minimal price. Today, the notified Minimum Support Price (MSP) is the price at which procurement of notified commodities is carried out by government agencies through FCI and other price support or market intervention schemes.

The DFI Committee observes, that though MSP is an important intervention by the government, it is not sufficient by itself. The honouring of the MSP through its use in procurement is a more substantive condition in making MSP mechanism effective. Hence, there is the need for a bouquet of procurement tools that can cater to different commodities in different ways.

However, this Committee also observed that MSP as discussed these days, is an administered purchase price, based on a predetermined margin on the cost of inputs. Market prices are observed to be far higher than the cost plus price model propounded under MSP mechanisms, for the large basket of produce types, particularly after a lapse of a certain time period, post the harvest.

The cost plus price proposed for farmers, by implication restricts them to a fixed margin against cost of cultivation. Even if 50 per cent is added as profit margin on the costs, the subsequent value to farmer is far removed from the wholesale price at terminal markets. The price dispersion at farm-gates and between them and wholesale markets is large for most crops. This is a relevant reality to be considered when assessing value of the produce and the share of that value assigned to farmers. A mind-set shift that looks at market linked realisation, instead of administered returns to farms is needed to take agriculture into enterprise mode.

The marketing system has to develop options that address the price dispersion between wholesale markets and farm-gate. This will lead to market led price realisations and not

gratuitous cost plus price mechanism only. Farmers' well-being is directly linked to their ability to carry out exchange at markets of choice, and this vision is discussed further.

4.2. Marketable Surplus

The assessment of the marketable surplus is made after putting aside the own consumption of the farmers. The producer is also a consumer, and marketable surplus is the quantum after factoring in this first consumer. This marketable quantity is the amount that is sent to markets to get monetised. Usually, this surplus undergoes exchange at the closest platform or the primary market channel that is accessible to the farmers.

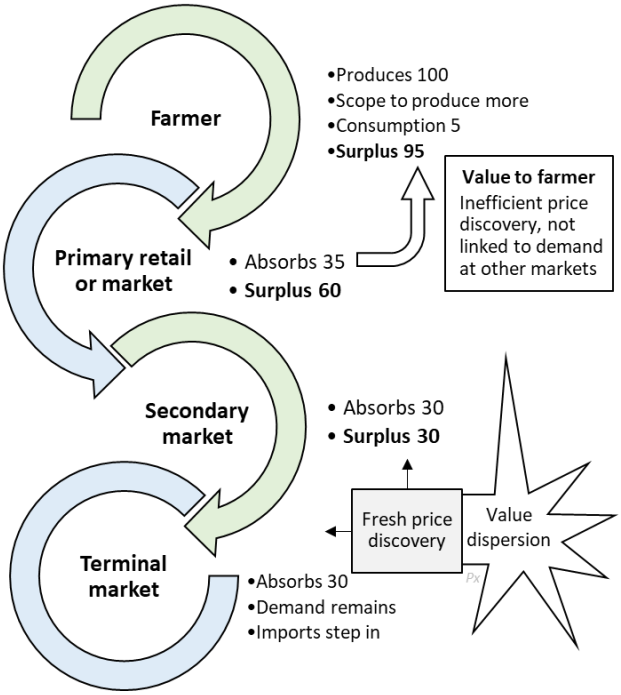


Figure 4.1 Illustrative of Demand-Value mismatch

However, these physical markets are linked to the demand from consumers within their catchment. They, therefore, have a limited capacity to absorb the supply of produce. When the supply is more than the immediate demand, there is a surplus in that region's market – the supply minus the local demand is the next level 'surplus' at these markets.

The system is designed to relieve the farmers of their produce at first instance, its value being ascertained by the demand-supply mismatch, resulting in a drop in the price due to local surplus. However, there remains a large demand at other market centres, which could have returned a higher value for the producer, than that which is generated at the near-farm markets.

Table 4.1 Surplus occurs at each stage in marketing

Source Market	Quantity (notional)	Consumer	Surplus (example)	Remarks
Farmer	100	Farmer	97	Marketable surplus sent to nearest market to get monetised
Primary retail or market	97	Consumer catchment	60	Supply can be in surplus to demand at nearest market, which lowers value
Secondary market	60	Consumer catchment	30	Next level market get supplied, which may also be in surplus
Terminal market	30	Consumer catchment	-10	Last mile market remains unsated and seeks imports

Figures as example

The farmer has no recourse to connect with demand farther afield and undertakes an exchange at the first market, off-loading the entire quantity at the value determined locally. The

unstructured system creates opportunity for various intermediaries who undertake the logistics to connect with the wider demand in the country, at more favourable value. The intermediaries actually serve an important function of arranging the onward supply of produce, however, the current system does nothing to structure this flow of produce, or open the market opportunity for small farmers to direct their marketable surplus to other demand centres.

Marketable surplus is a function of consumption and must be evaluated against various stages of demand and not merely at the level of farmer. Each market region has a limited capacity to absorb the production and the remaining is the market's 'marketable surplus'. The value of a farmer's produce is a function of demand and any mismatch with supply will detract from real market value, and will result in regional price dispersions.

The marketable surplus is distinct from the marketed surplus, which is expressed as a ratio of output-marketed to output-produced. Though the marketed surplus ratios are increasing, the marketing system must see that the exchange is possible at markets of choice and not necessarily at the nearest or primary market.

The market architecture needs to be evaluated and re-engineered so that, as a system, it can enable a directed flow of produce, to markets that can offer greater value to farmers.

4.2.1. Market demand for optimal value

Marketing of agricultural produce has at core a vital function, that is, to evaluate and project the market demand for farm products. This is intrinsically linked to the business of agriculture and income enhancement of farmers. This function is important to support agri-business, with the necessary market intelligence, for planning and supply of both farm-inputs and outputs.

Market intelligence as a marketing function, is an important support activity to the overall supply chain. It is important to understand that marketing is not the supply chain, but enables the supply chain to be more of effective and efficient, providing direction and value to the overall agenda of matching demand with supply to achieve optimal value realisation.

The following are the value adding aspects that will guide the operations that take agricultural output to markets:

(i) Demand capture – ability to capture historical data on consumer behaviour and analyse trends.

(ii) Demand Analytics – insights on market demand projections, to assess fluctuations in consumption patterns in short term and long term.

(iii) Communication of demand – upstream and downstream dissemination of demand assessments in advance of undertaking core activities in the supply chain.

(iv) Price forecasts – besides informing spot price signals, to provide future pricing indicators for produce, on the basis of demand and supply projections.

(v) Regulatory impact – assess and recommend course corrective measures to rules and regulations that impact the efficacy of the supply chain.

(vi) Marketing services – to provide services that enable a farmer to avail logistics to connect with other markets (market platforms) to allow the farmer producer/owner to make a transaction at a place and time of his/her choice.

Consumer awareness – making the consumer aware of the value of the agri-produce and product consumed, in terms of nutritional and socio-economic terms. Marketing functions include having influence on shaping the consumer's choice.

4.3. Vision to Capture Surplus

There is no denying the fact that the farmer today feels himself to be languishing at the bottom of the pyramid. The sector is suffering from the dichotomy of plenitude of production on the one hand and poor income for the farmers on the other. Hence, what is needed on priority now is to work out strategies to capture the totality of marketable surpluses generated by the farmers.

First and foremost, this calls for the creation of an enabling market environment with in-built mechanism to absorb as high a percentage as possible or the minimum 60 per cent of the surpluses as mentioned in table below, through an efficient market environment. The same table below also suggests an indicative breakup of various filters that can be deployed to capture the 100 per cent of marketable surpluses of different produce and offer the farmers optimal value on their produce.

Table 4.2 Breakup of sources to capture the 100 per cent of surpluses

SN	Intervention Mode	Primary responsibility	Targeted share in value capture	Nature of Produce
1.	Efficient market Environment	Open market price discovery	60%	All produce types
2	FCI Operations	Government of India	3-5%	Paddy & wheat
3	PSS & PSF Operations			Pulses & oilseeds
4	MAS (Market Assurance System) Schemes & Operations	States primarily with support from GoI	2-3%	All cereals & oilseeds (except wheat, paddy)
5	MIS Operations	GoI and States		Perishable produce
6	Private Commercial Trade Joint venture (majority share by private sector)	Private sector with incentives from Govt.	3-5%	All produce types
7	Cooperatives	Cafeteria of initiatives	25-30%	All produce types (agricultural, horticultural, plantation & livestock produce)
8	Contract farming			
9	Direct marketing (farmer-consumer / farmer-bulk)			
10	Special focus on sensitive trios - potato, onion & tomato – through models like Safal			

DFI

The targeted market share for each intervention mode is a broad based guideline, as the marketable surplus will vary across produce types. The share of surplus (marketed surplus) that

goes to market will depend on holding capability of the farmers and his or her own consumption requirement which they project till the next harvest and the extent of food losses incurred.

The strategy behind market capture is indicated as follows:

a) The 60 per cent of surplus is to be targeted for capture by the open and free market. This would include the entire basket of agricultural produce, food and non-food. For this, the marketing network needs to be opened to a larger number of actors, including alternate market channels.

b) The remaining 40 per cent of produce to be captured through other marketing mechanisms, would primarily focus on food output, such as foodgrains, pulses, oilseeds, nutri-cereals, fruits, vegetables and dairy products including milk. This would be categorised under-

   i. Ongoing procurement by Government, vide operations of FCI, PSS and PSF. Currently, these operations procure about (55 to 65 million tons) of cereals and pulses, which is about 25 per cent of foodgrains produced. This will account for about 5 per cent of the total agricultural produce of the country.

   ii. A similar quantity can be targeted through private stockists. A special scheme to bring private sector into procurement operations has been proposed in Chapter 6 of this document.

   iii. The ongoing Market Intervention Scheme (MIS) program of the Central government in partnership with the State governments currently intervenes to procure perishable produce like fruits and vegetables for which no MSP is notified. The procurement is not very impressive as seen from the negligible quantity of fruits and vegetables procured. Along with a new proposed market assurance scheme (MAS), which provides total freedom to the States to intervene, and procure any cereal (other wheat & paddy), pulses and oilseeds, then about 2 to 3 per cent of the total agricultural production can be targeted.

   iv. Another cafeteria of initiatives, by way of special interventions in case of sensitive crops like tomato, onion & potato; promoting market channels by mode of cooperatives, contracted cultivation and direct industrial marketing can be envisaged to handle the remaining, approximately 28-30 per cent of the agricultural output of the country, that includes livestock, horticultural and plantation produce.

A new market architecture, keeping in mind the key system of value linked supply chain is proposed in the following chapter.

4.4. Value chain & supply chain

Value chain is a term that conventionally refers to the set of core activities and support functions, internal to a business entity, to create and deliver its goods or services. Each core activity is captive to the firm and required to add value to make the individual enterprise more competitive in its functioning viz other firms in the same business. The individual firm or business unit, operates under independent capital and management, to achieve desired

outcomes.

Value chain optimisation refers to optimising the value capturing activities and the internal processes/procedures to improve the efficiency of these individual firms.

Supply chain refers to the flow of raw materials or goods from source to point of consumption. Very few business entities have the external supply chain as a captive activity under their ownership. The supply chain normally requires the system-wide integrated functioning of multiple firms, each actor having his/her own value chain, to connect supply with demand. A supply chain can be product agnostic and the actors can be transient in nature, as each is free to transact functions with others. Supply chain optimisation means managing and coordinating the chain of custody of the goods from supply side to demand.

In the agri-supply chain, each actor; the producer, aggregator, transporter, warehousing unit, processor, distributor and retailer; is not operating under any single umbrella of capital or management. Each operates individual business(es), and optimise their internal functions to remain competitive. Single business entities can, through acquisition and mergers, take ownership and internalise all the functions of the supply chain, but such vertical integration has high risks and is rare.

As such, the agri-supply chain requires the collaborative functioning of independent value chains as segments of the supply chain system. Since all actors play a role in fulfilling flow of goods for market delivery, they control a share in the final value realisation. This is also referred to as the agri-value system. India's agri-value chain or agricultural marketing system is currently a multi-layered composite of multiple actors, largely serving a push mode into markets. To take agriculture from push mode to pull mode of marketing, an inverse approach or fork-to-farm value based system needs to be encouraged and developed.

An **Agricultural Value System Platform** is recommended, to facilitate and guide the development of modern supply chains that will be cross regional in nature and promote demand based trade in agricultural produce. The framework of the proposed platform will be in partnership with think-tanks, industry, academia, donor agencies and government. The agenda will be to promote commercial projects that will function as a market linked system or an integrated supply chain of agricultural produce. The outcome focus will be to enhance the value captured by farmers to lead to doubling of their income.

The short term approach will be to dovetail ongoing schemes to support projects that improve the throughput of produce from farms to secondary markets, skipping intermediary markets. For long term sustainability, the proposed platform will also serve to optimise the value chain activities of farming units, by providing value added inputs such as market linked crop planning, resource management, partnership with other supply chain actors, coordinate extension activities and assist in improving access to local market channels.

4.4.1. Value chain analysis

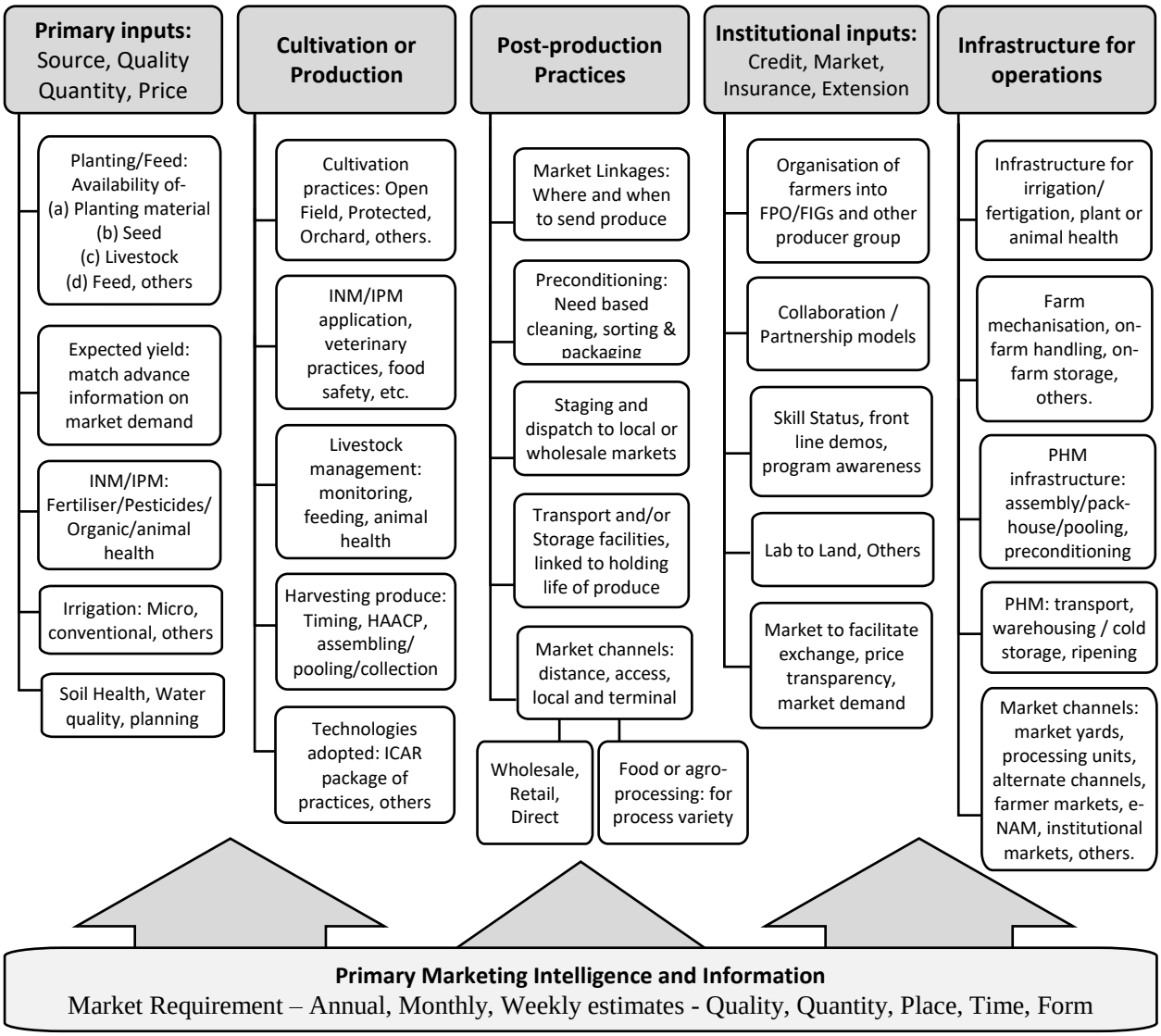
The chain of value adding activities for each enterprise will vary depending on the produce being handled, distance to market, volume being handled, capacity of the enterprise and various other factors. The pervading and most relevant information integrating all activities will be the assessment of demand from target market.

Table 4.3 Range of activities and items by actors in a value system

Primary inputs • Source • Quality • Quantity • Price	- Planting/Feedstock: Availability of (a) Seed (b) Planting material (c) Livestock (d) Feed, (e) others - Expected yield: match advance information on market demand - INM/IPM: Fertiliser/pesticides/organic manure/feed - Irrigation: Micro or conventional
Cultivation or Production	- Soil health, water quality - Cultivation practices: Open field, protected, orchard, others. - INM/IPM application practices, veterinary practices - Livestock management: monitoring, feeding, health - Harvesting produce: HAACP, assembling/pooling/collection
Post-production practices	- Technology adopted: ICAR package of practices, others - Aggregation, staging and dispatch to local or wholesale markets - Preconditioning: Need based cleaning, sorting & packaging - Transport and/or Storage facilities, linked to holding life of produce - Market Linkages: Where and when to send the produce - Market channels: distance, access, local and terminal market demand
Institutional inputs • Credit • Insurance • Extension • Markets	- Food or agro-processing: for the processing variety produce - Organisation of farmers into FPOs and other producer groups - Collaboration / Partnership / Services models - Skill Status, front line demos, program awareness - Lab to Land, capacity building, others
Infrastructure for operations	- Infrastructure for irrigation/fertigation, plant or animal health, farm mechanisation, on-farm handling, on-farm storage, others - PHM infrastructure: produce transport, warehousing/cold storage, pooling/assembly/pack-house, preconditioning lines, ripening - Market channels: market yards, processing units, alternate channels, farmer markets, e-NAM, institutional markets, others
Market demand Value assessment	- Demand for specific produce types, over time - Quality ranges preferred by produce consumer - Sources to meet the demand cost to meet the demand - Value variations on basis of supply fluctuations

Value chain analysis requires identifying the activities of individual enterprises, and applying a cost benefit diagnostics to aid optimisation decisions. To evaluate the entire value system, the same logic is applied system-wide to a cluster of firms, a region or the whole country, to arrive at a broad analysis of the larger value system.

Figure 4.2 Range of system-wide activities & items for analysing the integrated value chain



A system wide evaluation is a policy level tool to target reforms, but the desired value add to the involved actors will eventually result from individual value chain optimisation. Information on targeted demand will make each activity, from pre-production, production and post-production to be market linked. The demand projection is vital information, in the value chain, so as to avoid cost overruns and make the venture profitable. Understanding market demand includes measures of quantity, quality, food safety, and effects price discovery at the time of undertaking a transaction.

The driving force of a business enterprise is timely and accurate information on market demand. Agriculture too, will need information at regular intervals to optimise the agri-business value chain system. The information would not only help to make market linked decisions during crop planning, input sourcing and harvest time-lines, but also provide due cause for the right sized and rightly located infrastructure, such that capacity creation is with market flow and throughputs in mind.

An integrated value chain is customarily product centric, and the players play their respective roles along the combined chain of activities that comprise the supply chain for that product. The system or integrated value chain comprises the series of activities that vertically assimilated actors will undertake, to bring a product from concept to final use and disposal.

In the integrated value chain system, each assimilated actor, can themselves be product agnostic, and can bring their resources into use for various other products. For example, a farmer cultivating and selling mangoes can do intercropping of tomatoes and partake in the tomato value chain, while retaining his role in the mango value chain. Similarly a transporter may be part of the potato delivery system and at the next opportunity, use his/her assets to be a part of the value chain that moves paper rolls. Inter-sectoral shifts of value chain actors is not uncommon, and is in fact important for optimising capacity utilisation – their value offering.

Farmers can adopt new value chains when they diversify into other crops, undertake inter-cropping and handle multiple produce types. However, in the post-production phase, they can upgrade their role in the marketing of each product by undertaking next level activities need to connect to more optimal markets. Focus and support to identify and strengthen specific value chains has the potential to enhance income and add possibility to expand market range.

Key Extracts

- India's agricultural marketing policies have undergone frequent changes but still carry the legacy of a previous closed economy.
- The administered pricing of agricultural produce can be restrictive to future growth in farmers' income and refutes true value based pricing.
- A value based system is demand linked, and therefore pricing that is market-led is optimal and allows agriculture to be more intrinsically linked to economic growth.
- The marketable surplus is a variable along the marketing chain and correlates to the capacity of a market's consumer base to absorb the supply at any instance.
- An inter-connected market system, will allow the supply to skip a market level and directly connect for transactions at the next level in the supply chain.
- A system-wide integration to meet demand with supply, involves multiple value chains interacting and the actors integrating their activities into the supply chain.
- The key factor for enterprise level optimisation and supply chain optimisation is to extract best value through a targeted production and delivery system.

Chapter 5

New Market Architecture

Market infrastructure and other direct government facilitation for the greater welfare of farmers. The market architecture must promote inter-connectivity between markets and achieve a seamless flow of produce of varying characteristics. The marketing system should ideally function in hub & spoke mode and enable skip level selling while enhancing a choice of markets within accessible range of farmers.

5.1. Background

Growth in agriculture and allied sectors positively impacts the well-being of farmers in particular and the country at large. The farmers have served the nation well by achieving increase of agricultural output, and it is time that they are supported by a robust and comprehensive market structure that will lead to greater monetisation of the varied nature and substantive quantities of their marketable surpluses. Therefore, Government's focus needs to be more on the post-production interventions including marketing. While government led market interventions like procurements of wheat & paddy by Food Corporation of India (FCI); of pulses & oil seeds under Price Support Scheme (PSS); and that of perishables under Market Intervention Scheme (MIS) are important, they cannot be a wholesome substitute for an efficient marketing system.

Agriculture in India is dominated by small and marginal farmers, who constitute about 85 per cent of the total landholdings, with around 40 per cent share in the total marketable surpluses. Similarly, in case of livestock farming and fisheries, the output volumes load are small and dispersed at individual level and have to rely on the marketing system to link with wholesalers who deal in bulk volumes.

An efficient marketing system will at first instance require an inter-connected network of market centres. The inter-connectivity of the market centres will require to be correlated with the type of produce being handled at the market networks.

The National Commission on Agriculture (established in 1970) envisaged that by the year 2000, the country would have 30,000 assembly markets. As per the Commission, markets should be created close to villages, within a radius of 5 km. For this purpose, it recommended that existing local *shandies* should to operate on a daily schedule and be brought under regulation and upgraded to full-fledged assembly markets or sub-market yards.[13] The same recommendation was repeated by the National Commission on Farmers, 2004.

In the year 1970, the country had 19 States with 356 districts only, which by now have grown to 30 States and around 700 districts. In 1970 there were 70 million land holdings, which are now are approximately to 120 million (Census 2011). The total agricultural production including foodgrains, horticulture, spices, oilseeds, plantation crops, milk is more than one

[13] National Commission on Agriculture, Part XII - Chapter 56 (56.1.2)

billion tonnes. However, the distance a farmer can travel in one hour is far more than 5 km, with the country having created a vast network of rural roads and highways.

Today, there are about 2,284 regulated markets with 2339 number of principal and 4276 number of sub-market yards. On average, the market yards cover about 463 sq. km of geographical area or a radius of 12 km. However, there is a large difference regionally. In Assam, a wholesale market covers about 6442 sq. km (45 km radius), whereas in Punjab market covers 116 sq. km of area (6 km radius).

The country also has about 22,932 rural periodic markets accessed by farmers. These markets operate at intervals of a week or more, though in a few cases they are in function daily. The periodic markets cover an average area of 146 sq. km or a radius of 7 km. Further, some private markets have also come up in many states.

These rural periodical markets are not typically serving the needs as envisaged originally by the Commission of 1970. They operate as points of transaction, and do not provide any facilitation for farmers to link with other wholesale agricultural markets like the APMCs. Each market type, has become a point of sale where consumers or aggregators release the farmer of the harvested value, and the earlier conceived notion of assembly and onwards linkage has not been developed.

5.2. Existing market architecture

5.2.1. APMC markets

The current market system comprises about 2,284 APMCs which operate 2339 principal markets. These principal markets have extended their footprint through sub-market yards, which total 4,276. However, these sub-market yards are expected to operate as a part of the principal market yard under the associated APMC. By and large, sub-market yards are poor in terms of infrastructure, manpower and operations relative to their principal market yards. In essence, there are only 2339 principal markets which operate out of 6,615 locations (principal market yards plus their sub-market yards). These 2339 principal markets are further categorised as primary, secondary or terminal markets, depending on their location and the volume being handled.

Each principal market, has a designated area under its coverage. Regulations required that perforce, the notified produce of the region be transacted only in these regulated yards.

Therefore, a farmer is, by regulations, unable to freely transact an exchange with a buyer from outside the APMC control

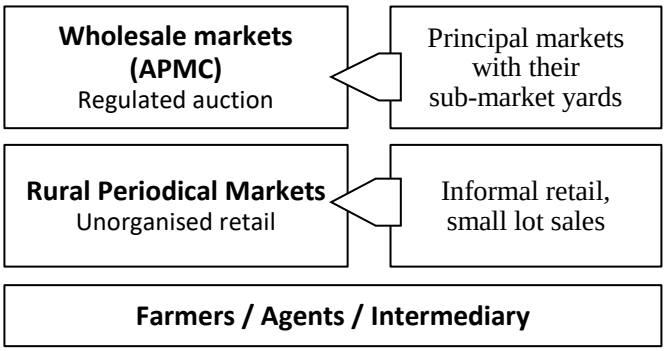


Figure 5.1 Existing market structure – with enforced intermediary exchange at every stage

area. This has tended to enforce a monopolistic mechanism for agricultural produce trade. Furthermore, the farmers have no system to even bypass the local market and connect with a larger or better paying market as they have no organised facility at an assembly centre to aggregate and transport their produce to other market centres.

Even direct connection with APMC markets, which are principally wholesale markets, is difficult for many farmers. The small & marginal farmers, with uneconomical sized marketable lots, find it difficult to aggregate their produce and move to these APMCs to participate in the auction system for suitable price discovery. They therefore use local agents and traders, who relieve the small farmer of their produce at locally determined prices, to function as aggregators and transport to transact at the APMCs. This intermediation has naturally been depriving the farmer-producers from aiming for optimal or market-linked price realisation. The current market architecture does not provide farmers with a choice of markets but imposes constraints to their selling options.

As per reports, the sub-market yards largely function as a location for the government procurement agencies and do not provide opportunity for open auction. The sub-market yards as of now, handle less than 5 per cent of the volume handled in the principal yards and are irregular in their operations.

5.2.2. Rural Periodical Markets

There are in the country large number of rural periodical markets (RPMs) that are located at village level. These are small *haats* / shandies that operate at intervals of a week or two and attract both sellers and consumers from the hinterland. An assortment of daily needs including farm produce (grains, fruits & vegetables are traded) at these places. These RPMs, numbering about 22,932 (as on 31.03.2017) are owned and managed by different agencies, namely, individuals, panchayats, municipalities, including State Agricultural Marketing Boards (SAMBs) / Agricultural Produce Market Committee (APMCs).

These RPMs function under traditionally existing informal procedures and provide the small farmers the opportunity to directly retail their produce to local consumers. In addition, aggregators and agents also frequent these *haats* to informally serve the marketing interests of small farmers. However, the opportunity to connect with larger markets that offer better value is not available to the small farmers. These RPMs serve as a stop gap measure, for farmers to tap into local retail buyers for quick transactions. The key bottleneck is a lack of facilities for the small farmers to consolidate their produce into viable quantities and link with other markets. This absence of resources to pool and move the produce, also tends to detract the farmers from any collaborative farming, as their marketing opportunity is limited to local consumers.

In parallel, many states have adopted farmer-consumer markets with varied success. These go by the names of *Rythu Bazaar* (A.P. and Telangana), *Raitar Santhe* (Karnataka), *Apni Mandi* (Haryana & Punjab), *Shetkari Bazaar* (Maharashtra), *Uzhavar Saathaigal* (Tamil Nadu) and *Krishak Bazaar* (Odisha). About 488 such markets are reported across the country, and provide

a platform mostly for transactions of produce like fruits, vegetables and flowers which are perishable in nature. The produce sold in these markets service the limited local demand.

5.3. Density of Markets

The availability and access to markets by all farmers in general, and small and marginal farmers in particular, is an important factor in the market architecture. Frequently, market density targets are spoken of, in relation to the market density recommended by the National Commission on Agriculture (1976). That Commission had recommended a market within range of 5 km of farms, a distance negotiable by walk or cart within an hour. This assessment was subsequently also reiterated by National Commission on Farmers (2004).

In pursuing this recommendation, the optimal market density is normally spoken of in relation to markets having a catchment area of 80 sq. km (5 km radius). The recommendation was originally made when road connectivity was minimal and farmers would bring their produce on head or on camel or bullock carts.

This Committee is of the opinion that the travel time - of one to two hours - from farm to market be the primary factor to ascertain market density, and not the physical distance. Creating markets in a radius of 5 km would not be relevant in this age of rural road networks, when farmers are frequently using motorised transport or tractor-trolleys. In areas of large surplus production, market catchment would also not need to factor in the wider national demand, and not related only to the local consuming population of the region.

Market density would therefore, be factored by involving multiple variables, including rural road connectivity, number of farmers in the region, type of produce, production (with cropping pattern and intensity) and access through road/rail to the unified national market. These factors are local and specific to each producing region and should be evaluated accordingly, when creating district and state level plans. The size of each market, the surrounding terrain and the clustering of farms must also be kept in mind. By and large, **a time radius of one to two hours**, for farmers to negotiate the distance from farms to markets, can be used as the guiding factor, in place of **a kilometre based radius**, to assess required market density.

Saturating the agricultural landscape, by blindly populating it with many market centres may not be a cost effective intervention. Addressing the need for aggregation and better access by farmers to state and national centres through collection centres would be a preferred option. Establishing assembly/collection centres, will initiate a hub and spoke system, these being the backward linkages of the wholesale markets or end buyer. These will open access to wholesale markets, besides serving local retail transactions. However, a broad need assessment is explained in the following section.

5.3.1. Assessment of Gap

The new Model APLM Act has provisions for establishing different models of markets in private sector, notifying warehouses and cold storages as markets in addition to government

Table 5.1 Basic data on marketing linked information from major States -

Name of major States	(WM= PMY+SMY)	No. of RPM	Area Sq.km	Area under Agri 000 ha (2012-13)	Cropping Intensity (2012-13)	Total Population	No. of Farmers	Foodgrain & oilseeds Prod ('000 tons)	Horti Prod ('000 tons)	Inhabited Villages
Andhra Pradesh	179	0	160205	8007	122.8	49471555	6491522	10446	19883	26286
Arunachal Pradesh	13	257	83743	285	131.7	1382611	302723	372	423	5258
Assam	226	1140	78438	4197	149.3	31169272	4061627	5470	6843	25372
Bihar	0	1794	94163	7778	144	103804637	7196226	15206	18624	39073
Chhattisgarh	187	1132	135191	5691	121.8	25540196	4004796	9097	9303	19567
Gujarat	400	0	196024	12600	122.3	60383628	5447500	7673	23162	17843
Haryana	281	0	44212	6376	181.5	25353081	2480801	16865	8016	6642
Himachal Pradesh	56	0	55673	947	174.2	6856509	2062062	1635	2447	17882
Jammu & Kashmir	25	8	222236	1162	156	12548926	1245316	1610	3535	6337
Jharkhand	190	602	79714	1657	117.9	32966238	3814832	5147	4764	29492
Karnataka	513	730	191791	11748	120	61130704	6580649	9228	20473	27397
Kerala	6	1100	38852	2592	126.5	33387677	670253	510	9867	1017
Madhya Pradesh	545		308252	23130	150.7	72597565	9844439	32627	24061	51929
Maharashtra	902	3500	307713	21874	126.1	112372972	12569373	15121	21668	40959
Manipur	0	119	22327	309	100	2721756	574031	503	811	2515
Meghalaya	2	124	22429	340	119	2964007	494675	285	1117	6459
Mizoram	0	220	21081	116	100	1091014	229603	65	613	704
Nagaland	19	174	16579	489	128.5	1980602	537702	602	1045	1400
Odisha	436	1548	155707	5069	115.6	41947358	4103989	9092	11765	47675
Punjab	435	1395	50362	7870	189.6	27704236	1934511	27603	6627	12168
Rajasthan	454	0	342239	23954	137	68621012	13618870	19148	3785	43264
Sikkim	0	19	7096	144	185.7	607688	117401	7069	425	425
Tamil Nadu	286	501	130060	5140	113.1	72138958	4248457	8056	17364	15049
Telangana	260	0	114840	5643	122.8	35193978	-	8250	7177	-
Tripura	21	533	10486	368	144.1	3671032	295947	731	1682	863
Uttar Pradesh	623	5107	240928	25821	155.9	199581477	19057888	49442	37135	97814
Uttarakhand	66	56	53483	1124	159.2	10116752	1580423	1777	1663	15745
West Bengal	475	2900	88752	9678	185.9	91347736	5116688	17057	30148	37469

WM (Wholesale markets) = sum of Primary Market yards and Secondary Market Yards. RPM = Rural Periodical Markets *Data provided by States to DMI*

See Annexures for details

If ranking the States by geographical areas, the sq.km covered per market will be far lower than when assessing by gross area under agriculture. However, if farms are not contiguous or clustered close to markets, then markets can remain underserviced or periodical.

Table 5.2 Comparative market coverage by States – across all market types.

States	Geographic area per market	Net sown area per market	Gross cropped area per market	Farmers per market	Villages per market
Andhra Pradesh	895	447	549	36265	147
Arunachal Pradesh	310	11	14	1121	19
Assam	57	31	46	2973	19
Bihar	52	43	62	4011	22
Chhattisgarh	102	43	53	3036	15
Gujarat	490	315	385	13619	45
Haryana	157	227	412	8828	24
Himachal Pradesh	994	169	294	36823	319
Jammu & Kashmir	6734	352	549	37737	192
Jharkhand	101	21	25	4817	37
Karnataka	154	95	113	5294	22
Kerala	35	23	30	606	1
Madhya Pradesh	566	424	640	18063	95
Maharashtra	70	50	63	2855	9
Manipur	188	26	26	4824	21
Meghalaya	178	27	32	3926	51
Mizoram	96	5	5	1044	3
Nagaland	86	25	33	2786	7
Odisha	78	26	30	2069	24
Punjab	28	43	82	1057	7
Rajasthan	754	528	723	29998	95
Sikkim	373	76	140	6179	22
Tamil Nadu	165	65	74	5398	19
Telangana	442	217	267	-	-
Tripura	19	7	10	534	2
Uttar Pradesh	42	45	70	3326	17
Uttarakhand	438	92	147	12954	129
West Bengal	26	29	53	1516	11

Area in sq.km, Population information as per census. Cropping intensity can indicate cultivation patterns and scope for future growth in production and market requirement.

Available markets, which include the APMC markets with sub-market yards and the Rural Periodical Markets, when evaluated against geographical are of the State will show that West Bengal and Punjab are have a similar density ratio. Odisha, Assam, Meghalaya, Arunachal Pradesh and Jharkhand are examples of low market density per geographical range. Yet when compared against gross cropped area, these states have better market coverage than Punjab and West Bengal.

Similarly, assessing market density on the basis of production alone is not sufficient as the type of crop, number of harvests in a year and scope to increase cropping intensity will have a role in market footfall. Furthermore, if Primary Rural Agri-markets as collection and dispatch hubs are established, the farmer footfall in wholesale markets can reduce as markets will handle flow of produce rather than individual transactions. Each primary aggregation centres would electronically dispense with the transactions remotely on behalf of the local farmers.

The main criteria of distance or time taken for farmer to travel to markets is not readily available for evaluation and may need primary research.

sector markets. The planning for increasing the market access by farmers is to be done by establishing markets with different ownership and management to create a competitive environment and creating multiple options for selling the produce.

The state and district level planners need to consider following key factors, in order of priority, to assess the need for a market-

i. Road (or rail/waterway) connectivity to communicate produce to market.

ii. Reasonable travel time to wholesale market, linked to safe travel time for produce type (eg. shorter for milk, longer for grain) and cost of travel.

iii. Number of farmers served by a market. As per information from States, on an average, principal market yards (PMY) receive about 300 farmers daily during rabi and kharif harvest season which last around 45-55 days respectively. Thus, peak footfalls of farmers is for about 100 days in a year, farmers normally visiting twice in each season. In case of sub-market yards (SMY), the footfall in the same periods is about 30-40 farmers daily and most come to sell at MSP to procurement agencies. A normative figure of 15,000 farmers can be considered to work out the need for additional markets.

iv. Production quantity, the size of each market and its capacity to handle volumes should be factored for prevailing crop type. On the basis of revenue generated from regulated markets, a normative quantity of 60,000 tonnes per market can be used as one of the criteria to work out requirement of additional regulated markets in the States.

v. Consumer population in the State can also be assessed as a factor for added market requirement. However, with improved connectivity, the market channels including online marketing will actually mean that markets in the future will cater to nation-wide consumers under the unified national market.

In the opinion of the Committee, the footfall and volume of trade as explained above will determine the need for a markets. These parameters in turn are largely a function of the geographical area, gross cropped area, net sown area, quantity of output, number of farmers and number of villages. It is advised, that the gap analysis of markets for the state/district is made by assigning weights to various indicated factors.

At the national level, a broad gap analysis for the country with respect to wholesale agricultural markets has been made. The States/UTs are initially grouped into region types on the basis of relative ranking in terms of geographical area (A), total agricultural production (B) and population (C). Accordingly, was given to the individual parameters as follows:

Weightage for **type A regions** is - Geographical area – 4, Production – 2, No. of Farmers – 2 and Population – 2; while weightage for **type B regions** is - Geographical area – 2, Production – 4, No. of Farmers – 2 and population – 2 ; and for **type C regions** is - Geographical area – 2, Production – 2, No. of Farmers – 3 and population – 3.

Table 5.3 Market Density Assessment *States are advised to apply locally correlated weightage to parameters to develop a more appropriate need assessment*

States/UTs	Regulated markets (PMY+SMY)	Geographic area per market	Farmers per market	Production per market	Population per market	Markets needed by geographic area	Markets required basis production	Markets required basis farmers	Market required basis population	Total Markets required	Additional regulated markets
(A) Relatively higher Geographical area											
Andhra Pradesh	**248**	657	15584	118	199482	**519**	487	322	330	435	187
Chhattisgarh	**187**	727	21416	81	136579	**433**	253	334	170	325	138
Gujarat	**400**	490	13619	72	150959	**624**	481	454	403	517	117
Karnataka	**513**	374	12828	65	119163	**611**	556	548	408	547	34
Madhya Pradesh	**545**	565	18063	97	133207	**981**	879	820	484	829	284
Odisha	**436**	357	9413	44	96210	**496**	320	342	280	387	Nil
Rajasthan	**454**	754	29998	48	151148	**1090**	365	1135	457	827	373
Telangana	**260**	442	9987	59	135361	**366**	256	216	235	288	28
Arunachal Pradesh	**13**	6442	23286	147	106355	**267**	32	25	9	120	107
Manipur	**0**	0	0	0	0	**71**	36	48	18	49	49
Meghalaya	**2**	11215	247338	1238	1482004	**71**	41	41	20	49	47
Mizoram	**0**	0	0	0	0	**67**	35	19	7	39	39
Nagaland	**19**	873	28300	132	104242	**53**	42	45	13	41	22
Sikkim	**0**	0	0	0	0	**23**	21	10	4	16	16
Tripura	**21**	500	14093	155	174811	**33**	54	25	24	34	13
Uttarakhand	**58**	922	27249	610	174427	**170**	590	132	67	226	168
Himachal Pradesh	**56**	994	36823	81	122438	**177**	76	172	46	130	74
Jammu & Kashmir	**25**	8889	49813	211	501957	**708**	88	104	84	338	313
Maharashtra	**902**	341	13935	32	124582	**980**	475	1047	749	846	Nil
(B) Relatively higher agri-production											
Haryana	**281**	157	8828	85	90224	141	**400**	207	169	263	Nil
Punjab	**435**	116	4447	82	63688	160	**594**	161	185	339	Nil
Tamil Nadu	**283**	460	15012	107	254908	414	**505**	354	481	452	169
West Bengal	**475**	187	10772	104	192311	283	**826**	426	609	594	119
(C) Relatively higher Population											
Delhi	**16**	93	2087	7	1049246	5	2	3	**112**	36	20
Goa	**8**	463	3919	316	182318	12	42	3	**10**	14	6
Kerala	**0**	0	0	0	0	124	176	56	**223**	143	143
Bihar	**0**	0	0	0	0	300	569	600	**692**	561	561
Jharkhand	**190**	420	20078	53	173507	254	167	318	**220**	246	56
Uttar Pradesh	**623**	387	30591	72	320356	767	752	1588	**1331**	1179	556
Assam	**226**	347	17972	60	137917	250	227	338	**208**	259	33
Total(A+B+C)	**6,676**	**37,170**	**685,450**	**4078**	**6377,398**	**10,450**	**9,345**	**9,893**	**8,046**	**10,130**	**3,568**

Regulated markets include PMY and SMY and it is assumed that all will function as wholesale markets, irrespective of current status of infrastructure.

Data in this table includes market-yard locations that may be currently inoperative

On broad assessment, there is a requirement for 10,130 wholesale markets functioning across the country.

As seen from the contents of the preceding table, the country will benefit from an additional 3568 wholesale markets; apart from strengthening all the existing 6676 number of principal markets yards (PMY) and converting the existing sub-market yards (SMY) into independent wholesale markets.

However, it is suggested that for a more credible assessment of additional markets, the States/UTs may assign differentiated weightage to each parameter as per the unique situation local to each region and work out the requirement.

The regional market requirements would preferably be developed through District and State level plans. However, for the system to be effective, the back-end aggregation to initiate such consolidated movement to wholesale markets is needed. A broad assessment indicates that assembly points as aggregation centres can be developed near villages. These can be co-located with the existing milk pooling centres or by upgrading the facilities at existing periodic retail markets. The concept is explained in following sections.

In the opinion of the Committee, the priority is to upgrade the infrastructure in the existing market system, so as to bring about an organised flow of produce from rural level to multiple market zones, on the basis of demand signals. This will make agriculture truly market linked.

In sum, the country may require a total of 30,000 markets comprising wholesale markets, and rural retail markets in the ratio of 1 : 2.

5.4. New Approach to Markets

The small and marginal farmers, as a majority, are restricted in their ability to move all their surpluses into markets. The existing market architecture does not promote such facilitation and rural market yards are merely points to assemble and transact, deficient in offering any systemic linkage with the unified national market. Therefore, the architecture is lacking a value linked system approach, and is limited to price mechanism that is locally derived, delinking the farmer from the wider demand.

Both, restrictive regulatory practices and absence of a market structure that can suck up the widely dispersed small lots of produce in an organised way, have deprived the farmer from his/her optimal share in the consumers' rupee.

The DFI Committee revisited the market architecture and the data available for such analysis. It is highlighted that the information is disjointed and a comprehensive redesign, specific to each region is recommended. However, on a broad-based level, some key changes are urgent to bring about sustained market linked growth for farmers. These changes are recommended keeping in mind the existing assets and resources already available in the form of various market types.

The new architecture will aim to inter-connect the farmers with multiple marketing

opportunities, through the wholesale and retail market networks. The Committee recommends that the sub-market yards numbering 4276, be upgraded into full-fledged wholesale markets, which will take the network from existing 2339 principal markets to about 6615 wholesale market facilities in the country.

To feed these wholesale markets, the Rural Periodical Markets (RPMs), about 23,000 in number, be upgraded into a function that enables aggregation and transport from village level to wholesale markets of choice. It is advisable to build on the available infrastructure and experience of the RPMs to establish large number of primary rural agricultural markets (PRAMs) to provide the two following services:

i) direct marketing between producers and consumers;
ii) aggregation platforms for the small lots of farmers.

The PRAMs will be the foundation of the new market architecture, having facilities to aggregate and organise the flow of farm produce and thereby, bring primary post-production activities at village level. PRAM centres, having a dual function to serve as local retail markets as well as assembly and aggregation centres, will deepen the market structure and broad-base direct participation from farmers.

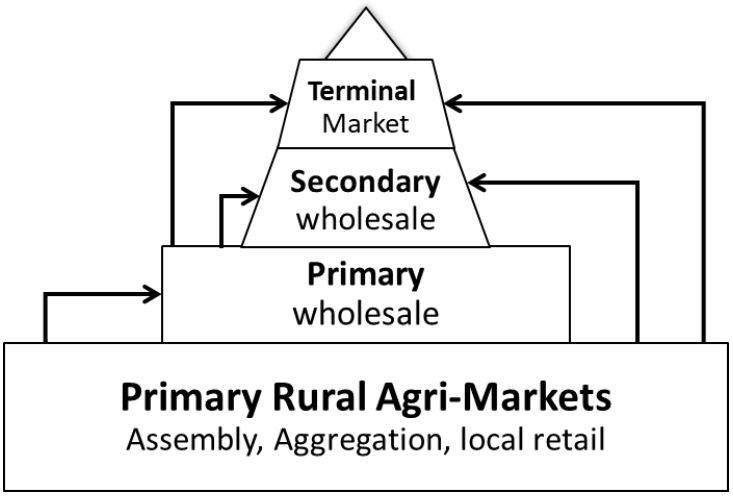


Figure 5.2 Foundation of market structure as PRAMs will generate a directed flow of trade

These decentralized primary centres, will especially benefit the small & marginal farmers who have the most need for aggregation of produce. These PRAMs will allow farmers a choice to connect with any market in the nation, provided viable transport and storage lots are developed.

This mechanism is similar to the way milk supply chain works, where small lots are pooled into viable transport lots to connect with the processing unit at a distance.

So far, most of marketing legislation reforms, in relation to the wholesale markets, had been under the perception that they were directly accessed by farmers. This is not true in practice.

However, market access is not by individuals only but has to be correlated to the managed flow of produce. Not much was arranged to facilitate and provision the organised flow of produce from village level, to allow the farmer and his/her production access to the markets.

In pursuing the establishment of PRAMs, the capability to connect the produce in suitable

quantities with markets of choice will be developed. Further, with farmers enabled with a choice of markets, the element of market to market competition will follow, to the advantage of the producers.

The main functional options of the new architecture are:

<table>
<tr><th colspan="2">Market</th><th>Function</th><th>Ownership and Management</th></tr>
<tr><td rowspan="2">Primary Rural Agri-Market centres (PRAM)</td><td>Assembly & collection centres</td><td>Aggregation and transportation
- Aggregation
- Assaying and weighment
- Post-harvest handling
- Short term storage
- Transportation
- Payment</td><td rowspan="2">Gram Panchayat/ Town Committee/ Municipal Committee / Entrepreneur / FPO / VPO / APMC</td></tr>
<tr><td>Retail Markets</td><td>- Buying & selling small lots
- Multi commodity in nature
- Transportation</td></tr>
<tr><td colspan="2">Wholesale markets
(primary, secondary, terminal)</td><td>- Auction of produce
- Payment
- Storage links</td><td>Agriculture Produce Market Committee / Private Markets / / Societies</td></tr>
<tr><td colspan="2">Warehouses
(also designated as markets)</td><td>- Assaying
- Inventory Management
- Pledge Loan
- Transportation</td><td>Private companies / State government / Procurement agencies / Commodity exchanges / FPO / VPO / Entrepreneur</td></tr>
</table>

The model Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act 2017, includes provisions that aid in increasing the density of different types of Wholesale Agriculture Markets, namely, primary, secondary and terminal. There is also provision to expand physical markets through licensing of existing warehouses and cold storages, as well the market network expansion through virtual online market networks.

The existing wholesale markets will get an expanded footprint with the adoption of the model APLM Act, 2017 resulting in an increase in the wholesale exchange. The inclusion of existing warehousing will also ease the physical bottlenecks at existing wholesale markets. This including online markets, will result in an immediate expansion of markets available and help the long intended and desired level of market density.

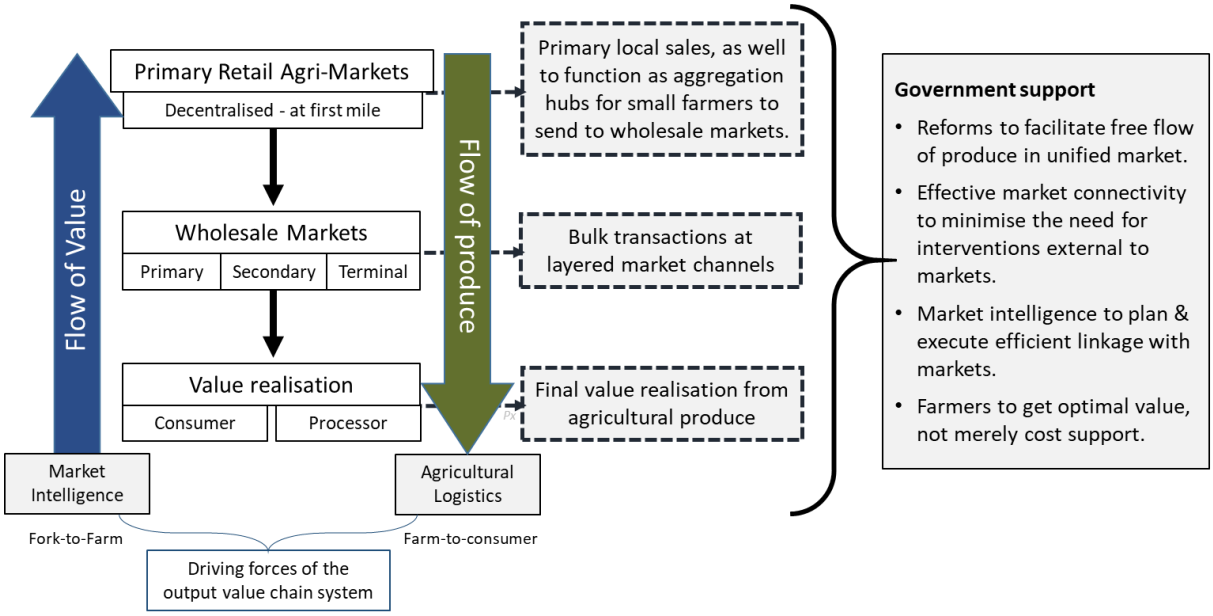
The Committee also recognises, that neither the existing APMC Acts of the states, nor the Model APLM Act, 2107 include provisions relating to these rural markets, focussed as they are on wholesale markets only. This Committee recommends framing of Primary Rural Agricultural Markets (PRAM) as a marketing infrastructure component.

5.5. Primary Rural Agri-Market (PRAM) centres

The Committee felt that the first-mile stage in the produces' movement to value realisation, needs to be strengthened. To align with the new strategy proposed, there is need to restructure how the markets facilitate the movement of farm produce to its multiple consumption points.

There is the need to create first stage, primary rural agri-market centres (PRAM) as the back-end spokes that feed into the forward hub-spoke network.

Figure 5.3 Primary Retail Agri-Market centres to organise village level handling



These primary rural agricultural market centres (PRAM) will have two roles. The first will be as local retail markets for the farmers to transact sales with consumers at near-farm locations. The second, will be as primary aggregation/pooling/assembly centres of farm produce, to facilitate the onwards movement to other market destinations. The locations will be the existing rural periodical markets which are at major village/hobli/firqa/gram panchayat centres.

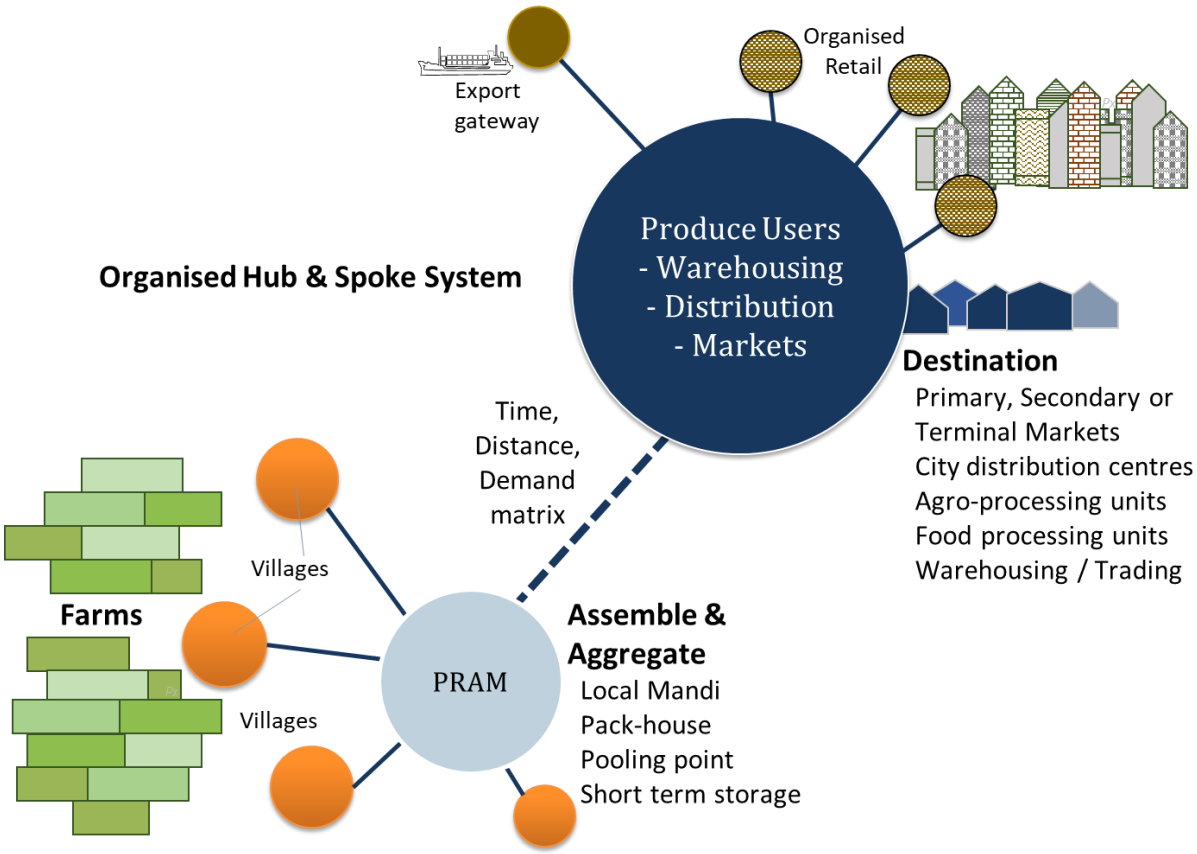
Being close to the farm-gates, the base of the pyramid will allow the farmers and rural communities to scale up their role in the overall value chain.

Each PRAM would suitably take up the services of a village level logistics hub, where milk output would be pooled, horticultural produce would undergo pre-conditioning, and other agricultural produce would be assayed and graded for onwards connectivity to next level markets. Hence, the PRAMs would necessarily have facilities that will allow first stage post-production activities at the first mile, located close to the villages and farms.

The PRAM are comparable to the thousands of assembly markets as also envisaged in the National Commission of Agriculture (1976), which were expected to function as assembly points for farmers with small scale load aggregation. These kind of organised assembly and

aggregation hubs, are a critical weak link that prevents the small famers to organise their forward linkages and therefore are forced to dispose their small lots to intermediary aggregators at the first instance.

Figure 5.4 PRAM in the hub and spoke logistics network



The collection facility will function for bulking (gathering together produce from different farmers to send to the buyer collectively). Such collection facility should be located within one hour travel of producing areas. It should also focus on requirement of orderly marketing i.e. cleaning grading, packing, labelling, etc.

The experience so far, however, shows that it has been difficult to promote primary wholesale agricultural markets, where farmer-sellers outnumber the traders. The Primary Rural Agri-Markers (PRAMs), will allow a large number of farmers to collaborate and direct their produce to wholesale markets of choice across the country. The ability to aggregate and communicate produce to other regions, will allow market-to-market competition to the farmers benefit.

This back-end organisation will also create near-farm jobs at the small pack-houses, mini-storages and the supporting processing units that will come up in the PRAMs. The type of technology deployed will depend on the type of produce from their catchment region. Existing aggregators can be upgraded as managers of these facilities, as well involve large food retailers that would wish to secure their back-end sourcing.

Creation of such retail and collection centres at block level that allows a supply cascade could potentially generate higher returns throughout the supply chain.

5.6. Location and Facilities

5.6.1. Location

The location of PRAMs should be in rural/semi-urban/per-urban/urban centres identified based on their potential to serve as a hub for a certain hinterland. The choice of such a hub should be guided by its potential to serve as a 'Farmer-Consumer Direct Market' or/and 'Aggregation Platform' that can linked the produce with a wholesale agriculture market (APMCs, etc.).

5.6.2. Systems and Infrastructure

The Department is advised to develop "Guidelines for Farmers' Markets" and share with the States/UTs. The Guidelines besides operational issues should also define the standards & specifications relating to layout, sale platforms, buildings etc., so that these markets evolve along 'uniform look and feel' across the country.

i) Systems and processes

The operational guidelines may lay down norms for conduct of intended functions in a hassle-free, transparent and accountable manner. The milk collection centres, where the small dairy farmers deliver milk every morning and receive their prices based on test values offer a good example for emulation with necessary changes. It is the bulk coolers of small size that facilitate collection and onward transfer of milk without spoilage. On similar lines perishable commodities will require pre-coolers and reefer vans to store & transport perishable commodities.

ii) Infrastructure:

- boundary wall/fencing;
- connecting road and internal road;
- goods transport service (cold & dry);
- electricity;
- Internet connectivity;
- waste disposal system;
- passenger transport;
- sitting/selling platform;
- weighing devices;
- dry/cold storage;
- drying platform;
- washing facility;
- cleaning, sorting, grading & packaging;
- office space.

5.7. Nature of PRAMs and Functions

5.7.1. Producer – Consumer markets

The small producers as sellers can avail of the basic facilities at the nearby regular / periodic markets to sell their produce, particularly perishable commodities, directly to the consumers. Section 11 of the APLM Act, 2017 provides for such a direct market and shall remain outside the regulation. All such existing direct markets in some states need to be further systematised and upgraded in terms of management, transactions and public hygiene. The large number of

existing RPMs will offer an easy choice in locating these farmer-consumer markets. Promotion of such markets is also feasible at semi-urban / per-urban centres by identifying suitable space.

5.7.2. Aggregation platforms

In order to achieve efficiency of marketing in transacting small lots of farmers, both non-perishable (grains) and perishable (fruits & vegetables), their aggregation is essential. It would help to build aggregation platforms in close proximity to farm-gates, and facilitate a formal & transparent system of aggregation, displacing the village-trader based intermediation that happens today in rural areas. The existing rural periodical markets (RPMs) can be utilized to build aggregation platforms, by putting in place the required infrastructure and processes. The farmers will bring their small lot of marketable surpluses to these markets and the same can be processed or cleaned, sorted, graded and packaged for further transportation & sale through auction at regulated markets (APMCs, etc.). Alternately by assaying the aggregated lot at the same location, it can be traded online via electronic platforms like e-NAM.

This process can be operationalized by mobilising the farmers as well as interested retailing organisations, into 'Farm-Produce Marketing Organisations (FPMOs)' in the form of a company or a cooperative for the purpose of marketing only. FPMOs can displace village trader as the intermediary, as well create unhindered channels to networks of organised retail outlets.

5.7.3. Fund Requirement:

Fund required to develop these markets can be mobilized from existing schemes like Rashtriya Krishi Vikas Yojana (RKVY), Integrated Scheme for Agricultural Marketing (ISAM), Mission for Integrated Development of Horticulture and MGNREGA. The sharing norms as applicable between Centre and State may be adopted.

In addition, the markets can be developed under private sector, through PPP mode, creating SPVs between existing ownership of RPMs and sub-market yards and partner stakeholders. Agro-processors and food processors that wish to establish a sustained back-wards integration to secure their raw material can also participate in such organised sourcing through the rural primary agri-markets.

5.8. Other enablers in Agricultural Marketing

A situation analysis immediately brings forth the fact that marketing of produce is hampered most by the handling size of the farm produce or the marketable lot size. Unless the post-production volume is of a shared character and of sufficient quantity at the first stage of handling, the subsequent handling to connect with markets is inefficient.

The fragmented land holding dictates small volume outputs per farm. However, small holdings are managed more attentively and achieve higher productivity, if the output is aggregated for marketing.

5.8.1. Small farmers, small volumes

In the context of doubling of farmers' income, the strategy should necessarily be inclusive, as 85 per cent of the farmers of the country are small and marginal. The size of operational holdings in India is declining continuously with every successive generation. Needless to say that the small farmers do not have economies of scale and access to market or information.

The country is estimated to have more than 137 million operational farm holdings under different size groups. The number of smallholders, consisting of marginal and small farmers (less than 2.0 ha land holding), has increased from 70 per cent of total land holding during 1970-71 to 85 per cent in 2010-11. The average size of land holding has declined from 2.28 hectare in 1970-71 to 1.15 hectare in 2010-11.

Table 5.4 State-wise land holding patterns

	Marginal		Small		Semi-Medium		Medium		Large		All Holdings	
State/UT	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11
All Major States												
Andhra Pradesh	0.4	0.4	1.4	1.4	2.7	2.6	5.7	5.6	16.3	15.5	1.3	1.1
Bihar	0.3	0.3	1.2	1.3	2.6	2.6	5.2	5.1	15.5	14.5	0.6	0.4
Chhattisgarh	0.4	0.4	1.4	1.4	2.8	2.7	5.9	5.7	12.0	16.3	1.4	1.4
Goa	0.3	0.5	1.3	1.8	2.6	2.9	5.6	6.2	23.8	24.2	0.8	1.1
Gujarat	0.5	0.5	1.5	1.5	2.8	2.8	5.8	5.7	16.9	20.9	2.3	2.0
Haryana	0.5	0.5	1.4	1.5	2.8	2.9	6.0	6.1	16.5	18	2.3	2.3
Himachal Pradesh	0.4	0.4	1.4	1.4	2.7	2.7	5.7	5.7	15.9	15.5	1.1	1.0
Jammu & Kashmir	0.4	0.4	1.4	1.4	2.7	2.7	5.4	5.4	21.1	22.3	0.7	0.6
Jharkhand		0.4		1.4		2.7		5.6		15.4		1.2
Karnataka	0.5	0.5	1.4	1.4	2.7	2.7	5.8	5.7	14.8	14.7	1.7	1.6
Kerala	0.1	0.1	1.3	1.6	2.5	2.8	5.3	5.3	40.9	64.6	0.2	0.2
Madhya Pradesh	0.5	0.5	1.5	1.4	2.8	2.7	5.9	5.8	15.5	15.8	2.2	1.8
Maharashtra	0.5	0.5	1.4	1.4	2.7	2.7	5.6	5.6	15.4	16	1.7	1.4
Odisha	0.5	0.6	1.4	1.6	2.7	3.0	5.6	6	16.5	23.7	1.3	1.0
Punjab	0.6	0.6	1.4	1.4	2.7	2.6	5.8	5.7	15.1	14.8	4.0	3.8
Rajasthan	0.5	0.5	1.4	1.4	2.9	2.8	6.2	6.1	18.2	17.5	3.7	3.1
Tamil Nadu	0.4	0.4	1.4	1.4	2.7	2.7	5.7	5.6	19.5	20.1	0.9	0.8
Uttar Pradesh	0.4	0.4	1.4	1.4	2.7	2.7	5.5	5.5	25.1	15.0	1.0	0.8
Uttarakhand	0.4	0.4	1.4	1.4	2.7	2.7	5.6	5.5	15.1	23.1	0.8	0.9
West Bengal	0.5	0.5	1.6	1.6	2.8	2.7	5.1	4.9	279	316.2	0.8	0.8
North-Eastern/Hill States												
Tripura	0.3	0.3	1.4	1.4	2.6	2.5	5.2	5.1	78.8	14.3	0.6	0.5
Arunachal Pradesh	0.5	0.6	1.3	1.3	2.7	2.8	5.8	5.5	16.1	14.9	3.7	3.5
Assam	0.4	0.4	1.3	1.4	2.7	2.7	5.2	5.2	53.0	68.1	1.2	1.1
Manipur	0.5	0.5	1.3	1.3	2.5	2.5	4.9	4.9	11.4	11	1.2	1.1

	Marginal		Small		Semi-Medium		Medium		Large		All Holdings	
State/UT	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11	2000-01	2010-11
Meghalaya	0.6	0.5	1.5	1.3	2.6	2.8	5.4	5.7	13.1	16.5	1.3	1.4
Mizoram	0.6	0.6	1.3	1.3	2.3	2.4	4.8	5.1	13.1	15.1	1.2	1.1
Nagaland	0.5	0.5	1.2	1.1	2.6	2.6	6.2	6.2	15.8	17.6	7.3	6.0
Sikkim	0.4	0.4	1.4	1.2	2.7	2.5	5.8	5.4	20.7	15.8	1.6	1.4
Union Territories												
A & N Islands	0.4	0.4	1.4	1.4	2.5	2.6	4.3	4.3	46.8	36.9	2.0	1.9
Chandigarh	0.4	0.5	1.4	1.4	2.7	2.9	5.8	5.7	16.5	11.1	1.6	1.3
Dadar & Nagar Haveli	0.5	0.5	1.3	1.4	2.8	2.8	5.8	5.7	16.0	15.5	1.5	1.4
Daman & Diu	0.3	0.2	1.4	1.4	2.6	2.6	5.9	6.3	20.3	20.0	0.6	0.4
Delhi	0.4	0.4	1.4	1.3	2.9	2.7	5.8	5.6	15.3	15.1	1.5	1.5
Lakshadweep	0.2	0.2	1.3	1.4	2.6	2.5	5.5	6.1	22.3	24.0	0.3	0.3
Puducherry	0.3	0.4	1.4	1.5	2.7	2.9	5.7	5.7	19.5	16.9	0.7	0.7
Total	**0.2**	**0.4**	**1.4**	**1.4**	**2.4**	**2.7**	**4.4**	**5.8**	**13.2**	**17.4**	**1.3**	**1.2**

Source: Agricultural census, various

Higher income realisation per unit of land is vital for making small land holdings economically viable. Minimisation of transaction cost and tapping high value market are options to provide an opportunity to smallholders. This calls for increasing their effective size through various alternatives available. These include cooperatives, producer's companies, cluster formation, etc. so as to reduce the transaction costs to cultivate per hectare and ensure better and collective participation in the marketing system.

Making farmer producer organisations (FPOs), as cooperatives or companies, more relevant in countering the situation of small land-holding has assumed critical role in the context of today's land holding structure, predominantly populated by land sizes of an average of 0.65 ha.

5.8.2. Farmer producer organisations

Grouping farms together, to operate in collaboration as a large cluster is the concept behind forming farmer producer organisations. Small Farmers' Agri-business Consortium (SFAC) is the nodal agency at the national level for the creation of FPOs.

A cluster approach is necessary to bring about a critical economy of scale at farm-gate, so that farm inputs can be better managed, the cultivation gets consolidated care and the output from farms has viable scale for modern post-production handling.

However, for these benefits to accrue, the farmer group creation process, needs to focus on grouping contiguous tracts of land (as far as practicable) and not just the grouping of individuals. The end outcome aimed is collaborative farming, where the entire group farms a common set of crops in farms that adjoin one another.

Table 5.5 State-wise number of FPOs promoted by SFAC

SN	State	No. of Farmers			No. of FPOs		
		Mobilized	Under Mobilization	**Total**	Regis-tered	Under process	**Total**
1	Andhra Pradesh	6360	640	7000	5	2	7
2	Arunachal Pradesh	1750	0	1750	2	0	2
3	Bihar	19065	3935	23000	19	5	24
4	Chhattisgarh	20670	5330	26000	10	15	25
5	Delhi	3535	0	3535	4	0	4
6	Goa	1810	0	1810	2	0	2
7	Gujarat	18959	1041	20000	20	1	21
8	Haryana	13240	0	13240	23	4	27
9	Himachal Pradesh	4887	0	4887	5	0	5
10	Jammu	3694	287	3981	1	2	3
11	Srinagar	3120	960	4080	1	3	4
12	Jharkhand	10009	0	10009	8	0	8
13	Karnataka	103904	18596	122500	102	18	120
14	Madhya Pradesh	111010	33990	145000	126	18	144
15	Maharashtra	88348	3152	91500	85	7	92
16	Manipur	2884	4066	6950	4	4	8
17	Meghalaya	2990	760	3750	3	1	4
18	Mizoram	1700	1000	2700	0	3	3
19	Nagaland	1750	0	1750	2	0	2
20	Odisha	28663	10237	38900	30	12	42
21	Punjab	6288	0	6288	7	0	7
22	Rajasthan	47079	3421	50500	38	2	40
23	Sikkim	1876	0	1876	2	0	2
24	Tamil Nadu	10945	55	11000	11	0	11
25	Telangana	24539	0	24539	20	0	20
26	Tripura	2874	0	2874	4	0	4
27	Uttarakhand	6004	0	6004	7	0	7
28	Uttar Pradesh	35746	0	35746	33	2	35
29	West Bengal	61266	8234	69500	62	6	68
Total		**6,44,965**	**95,704**	**7,40,669**	**636**	**105**	**741**

As of 10-July-2017

In addition to the 741 farmer producer organisations promoted through Small Farmers' Agri-business Consortium (SFAC), another 339 FPOs have been promoted by other state agencies, bringing the total to 1,080 in the country. FPOs exist across the country, mainly registered under statutes such as the Cooperative Laws, and lately under the Companies Act as Producer Companies. Associations, Trusts and Federations are also formats of organised collaboration among farmers.

The benefits from grouping together of farms are essentially from generating viable logistics capacity in the supply of raw inputs (fertilizers, planting material, irrigation, etc.) leading to an incremental reduction in input costs. Similarly, farming on contiguous land allows a collective functioning, for the viable deployment of farm mechanisation, optimising labour costs, and for post-harvest activities.

Most importantly, back-end collaboration can shift the control of the value system into hands of the FPOs once meaningful scale is achieved for the transactions on both inputs and supply side.

The perceived economy of scale from FPOs, needs to essentially translate into gainful value on the following principal fronts-

a) Raw Inputs (eg. assured volume of fertilizer and planting material can lead to incremental reduction in input costs)
b) Farm mechanisation (eg. contiguous farming can lead to viable deployment of harvesting combines or other farm mechanisation – incremental reduction to labour)
c) Post-harvest Infrastructure (eg. capacity utilisation is justified for pack-houses, grain silos, transportation, etc – a transformational change in supply chain)
d) Market access & connectivity (eg. control of value chain system shifts into hands of FPOs once meaningful volumes are available to transact on both supply and inputs)

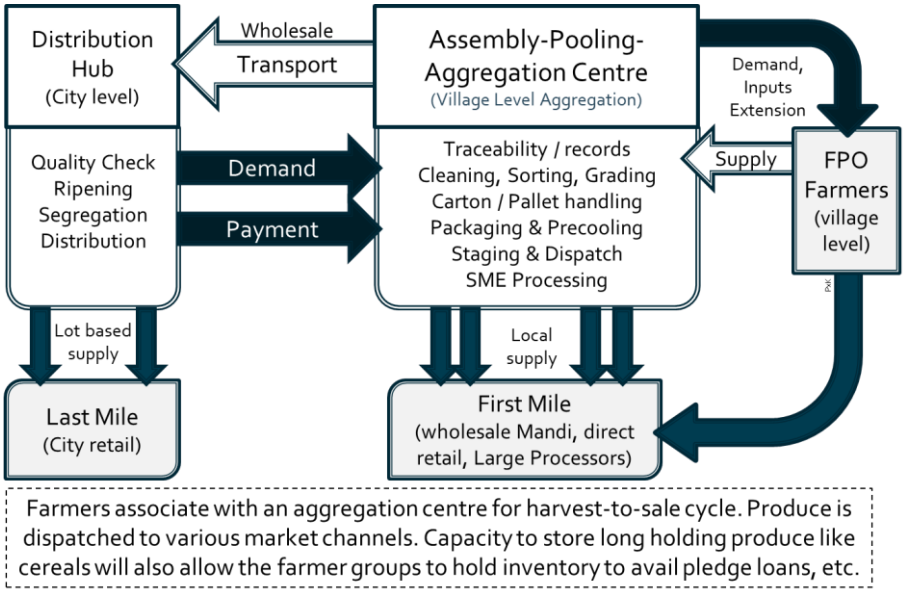
At the moment, in its first phase of development, FPO formation has primarily focused on mobilising the interested farmers together, clubbing these individuals to avail options of equity and credit support. In the second phase, it is recommended that this be matched with allied efforts to coerce members of FPOs to undertake collaborative farming by the clubbing together of farm-land and to undertake next level activities such as aggregation and transport to markets.

It is recommended that the FPO development mechanism must henceforth focus on the bringing together of farm land, such that the soil health assessments, inputs (planting material, fertilizer, irrigation), farm labour and mechanisation, extension works, can be deployed at incrementally lowered and optimised costs. Similarly, the farming can be for a common set of crops, and the consolidated output would then be of a scale that brings improved viability and leads to a transformation of the supply chain.

Grouping together of individual farmers with non-contiguous holdings, will not lead to the desired economy of scale in respect of both inputs and outputs. It must be kept in mind that negotiation power through collectives is worth its while only when the outcome is a common produce type, in large volumes, for cross-regional markets.

Collaboration of farmers to collectively cultivate and harvest a common set of produce, is not sufficient. There is subsequent need to advance efforts to connect the produce with markets farther afield. Without suitable market connectivity, the output from such collaborative farming will be directed only to near-farm markets, which will lead to a localised glut, with associated price repercussions. Therefore, the economy of scale from collaborative farming will need to be linked to multiple demand centres to maximise on the market opportunities.

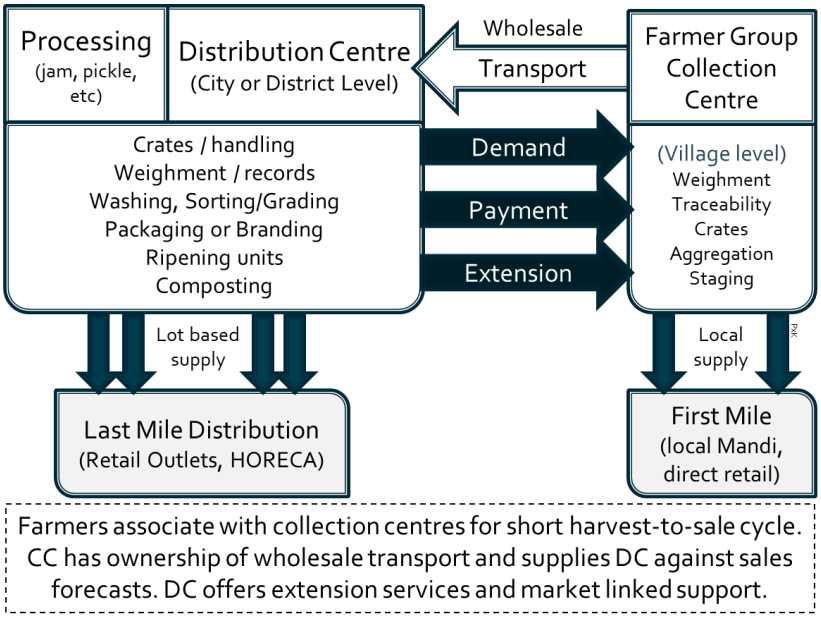
Figure 5.5 FPO model of market connectivity



Developing such an arrangement for FPOs will also lead to long term market linkages for the selected produce and will make income enhancement of farmers a sustainable program. To arrange collaborative farming, the procedure for forming FPOs can look at grouping land under a village, to create village level farm organisations. Such village level collaboration will bring greater control of the production and post-production activities, to entire village communities.

FPOs can also be created for groups of farmers in close proximity to urban centres. The close proximity of large demand centre will change the operating model. In such cases, the cluster size per crop could be smaller, with more diversification in crops. The shorter and more direct access to urban markets will however offer quick evacuation of produce and faster cash flows.

Figure 5.6 City-proximate farms and marketing operations



FPOs are currently not formed with prior basis of a preferred crop type or on the basis of the availability of adjoining farm plots. In the future, development efforts can be undertaken to support collective or collaborative cultivation for specific cultivars for targeted markets.

5.8.3. Need to build FPOs/VPOs

Since the initiation 2012, the country has organised as few as 1080 FPOs. After having accepted the importance of FPOs in India, it would not be appropriate to remain at the starting line, as is the case today. Among these FPOs there are several successful cases that offer learnings for replication in a large scale.

Village produce organisations can be developed as a joint venture of FPOs, or JV of a private company and FPO, or with public private participation, such that an entire village region is developed for a predetermined set of agricultural produce, as well as with post-production activities. For example, a region having strength in producing fibre crops can be developed as a VPO to include small handloom, weavers or handicraft units.

Similarly, a village that has appropriate agro-climatic environment for mangoes can also intercrop tomato and other vegetables and take up post-production management such as aggregation, packaging, branding and dispatch to markets. An example in grapes around Nasik, where entire regions around villages are cooperating to expand productivity and in post-production is already evident.

A VPO would essentially be a cluster of farms in a village region that will function as a collective for predetermined outputs. Such a mechanism of natural clustering of activities can be expected to find greater buy-in and alignment with activities of the local population.

Considering the critical need to economise on the cost of production, as also realise efficient post-production transactions, the scaling up of farmer producer organisations (more particularly companies) and village producer organisations (VPOs) across the country should happen quick and fast. In the view of this Committee, a minimum of 7,000 number of FPOs & VPOs should be targeted by 2022-23 and double that target number in the six years thereafter.

At an average of 1000 hectares of cultivated land under each such organisation, and 1000 farmers per FPO / VPO, the organised number of farmers would be 7 million and pooled land would be 7 million hectares by 2022-23. This will scale up to an additional 14 million farmers and 14 million hectares by 2029-2030.

If success is demonstrated over the following years till 2022-23, the scale up thereafter may acquire greater momentum than targeted. What is, therefore, critical is to work towards creating a critical mass of successful FPOs / VPOs in the coming 5 years.

In the following section, the constraints and challenges and their negotiation as also the way forward to achieve the desired scale is discussed.

5.8.4. Scale up village level, farmer producer organisations

Ongoing support for FPOs is in mainly in the form of –

- Grant of matching equity (cash infusion of upto Rs 10 lakhs) to enhance the credit worthiness of registered FPOs (Farmer Producer Company - FPC).
- Credit Guarantee Cover to Eligible Lending Institution (ELI) to minimise their lending risks and thereby enable provision of collateral free credit to registered FPOs (maximum guarantee cover 85% of loans not exceeding Rs. 100.00 lac).

FPOs can also avail financial support provided for post-harvest management and processing under general category, vide-

- Post-harvest Infrastructure support from MIDH (DAC&FW) - central sector scheme and centrally supported scheme.
- Warehousing financial support through ISAM scheme of DAC&FW.
- Processing Industry infrastructure from MoFPI – central sector scheme.
- Venture Capital Assistance through scheme of SFAC.
- Credit for cooperatives from NCDC
- Projects under RKVY, operated through state governments.

Though there is sufficient focus on financial assistance, there is limited hand-holding subsequent to formation of a farmer producer company or organisation. This means, that after mobilisation of farmers into a group, there is very little support in marketing, value added logistics or in B2B interactions. There is a need for incubation support to FPOs so that they have a greater clarity of their value chain involvement and can address their concerns better. Effective and ongoing engagement of FPOs with government, donors and markets is being done piecemeal and not in a systemic manner.

Banks tend to refuse to lend to FPOs due to disaggregated land holding or lack of other collateral. Small and marginal farmers, who account for more than half of the total land holdings, and who may not hold formal land titles, are unable to access institutionalised credit. The producer companies are not provided the same incentives/grants and are also liable to tax on their income, unlike cooperatives. Among other constraints in scaling up operations of FPOs / VPOs, is the limited access to professionals to meet the statutory compliances of a producer company. These include book keeping, registration of Board of Directors (who may be marginal farmers and illiterate).

Agriculture is not only food items and a lot of the produce in fact supports artisans, weavers, handicrafts, etc. Various online platforms already provide opportunity for such output to link with a wider market. There is opportunity to promote non-producer companies to create joint ventures with village enterprises and take their unique products global. Therefore, government can promote non-producer marketing enterprises to enter into joint venture with FPOs, or

conversely allow FPCs to add a limited number of members from non-farmers.

To make further development efforts, on FPOs, to be market linked, the following steps are recommended –

a. Identify FPOs with contiguous land or with scope for scalable production. This may also be done at village level to promote village producer organisations (VPOs)
b. Identify target markets - map consumption, crop wise with volumetric demand
c. Evaluate distance from FPO location to target markets and evaluate produce selling cycle, minimum and maximum. For selling cycle of greater than 48 hours, list the added support systems needed to access the markets
d. Support FPOs to develop relevant market infrastructure/linkage through capacity building, value chain analysis and partnerships with external value chains.
e. Fast tracked soil health mapping and crop planning for each FPC. Provide FPC with scientific and specific crop plans for 3 years.
f. All procurement by government agencies be made through FPOs, preferably.
g. Special incentive to FPCs that are willing to set up infrastructure in mega food parks.
h. Wholesale buyers that develop long term buying arrangement with FPOs be provided a freight subsidy on the throughput as declared/certified by FPO.
i. Income tax exemption to FPOs for 5 years, similar to that provided to infrastructure projects of cold-chain and food processing.
j. Provide regular training and business level hand-holding to FPOs for the first three years – this may include incubation support in initial phase of development, provided the FPOs take up collaborative farming on contiguous land holding.
k. Besides SFAC, companies from the private sector can be allowed to promote FPOs to suit their specific market needs while maintaining a stake in the FPO. Non-producer entity may be allowed to invest stake in a Producer Company, upto maximum 26 per cent. This will allow to develop financial strength and attract external professional management. This will need amendment of the Companies Act which currently only allows farmers to be producer members of an FPC.

This directed approach to linking FPOs with target markets, is expected to result in an immediate thrust on productivity at farm level. Without appropriate market linkage, farmers are hesitant to adopt high productivity practices for fear of incurring losses due to low level of market access. Central government has already advised states to treat FPOs at par with cooperatives and this may be implemented by all states.

This committee has recommended a Value System Platform (Chapter 8), which may be specifically focus on FPO development. The platform includes District level structure, and the

activities to form and develop FPO and VPO can be conducted at District level with the respective state government to maintain a bottom up approach and involvement. If the State and District level value system platform take ownership of FPOs/VPOs, it will fill the existing structural and organisational gap that exists in their promotion, and also connect the two organically.

5.9. Stable Trade Regime

Marketing opportunity for the produce have to be expanded beyond the domestic frontiers. The export potential should be harvested. Indian agriculture under the WTO regime is already integrated with the global market. Imports too happen, particularly in case of certain deficits like oilseeds and for other specific consumer preferences. Agreed upon market access protocols and Trade Agreements with other countries also ensure the scope for import and export of agricultural commodities. A stable trade regime will help both farmers and other stakeholders from a long term view in building market relationships.

A cursory look at the Agricultural Trade Policy and tariff changes over the last decade, will show that there have been frequent and short term adjustments. Long term market relations are put at risk when trade policy is varied in the short term and unstructured in nature.

Taking the case of wheat as an example, in the last eight years (between 2007-08 and 2014-15), the import tariff was largely zero. In August 2015, import duty was raised from zero to 10 per cent and subsequently within a month in October, 2015 it was raised further to 25 per cent. A year later, the import duty was reduced to 10 per cent in September 2016 and was brought down to zero in December 2016. In March 2016, the duty was again raised to 10 per cent.

In case of pulses, during the last 10 years, the imports were allowed at zero tariff. Only during March, 2017, the import duty on Tur dal was raised from zero to 10 per cent. Though having raised the duty, *Tur* Dal imports continued at zero duty from Myanmar and a few African LDC countries. These countries enjoy tariff concessions due to the Indo-ASEAN FTA (in case of Myanmar) and DFTP scheme (in case of LDC countries). In such situation, high import duty alone cannot be the answer. It will entail closer monitoring to ensure that the imports are happening from the concessionaire country by obliging it to furnish a certificate of origin.

Similarly, import tariffs on edible oils show frequent changes. The import duty on crude palm oil was at 60 per cent during January, 2007. It was reduced over the next one year to 50 per cent, then 45 per cent to 20 per cent and set at zero during April 2008. It remained so for the next 5 years and again was raised to 2.5 per cent in January 2013, then raised to 7.5 per cent in December 2014 and again increased to 12.5 per cent during September, 2015. It was reduced to 7.5 per cent after one year, in September, 2016.

In parallel, the import tariff on refined palm oil also shows wide variations during the last 10 years. It was at 67.5 per cent during January 2007 and in the next one year was gradually reduced to 57.5 per cent, then 52.5 to 27.5 per cent and finally to 7.5 per cent during April

2008. It again was changed to 10, 15, 20 and 15 per cent over the next eight years.

In July 2017, having taken a more comprehensive view from the perspective of oilseeds producing farmers and the need to acquire greater self-sufficiency in this sector, the import duty have been notified at 30 per cent on refined oil and 15 per cent on crude oil.

Similar import tariff changes were effected in respect of other edible oils such as crude sunflower oil, soyabean oil (crude), mustard/rapeseed/colza/canola (crude) and all other edible oils (crude). They were all brought down to zero per cent during 2008 and then raised subsequently. In case of refined oils too, tariffs were brought down during 2008 and then increased subsequently.

Such frequent changes are triggered by concerns of consumer unease over prices, but cause disruptions in cultivation patterns at domestic farms. Sudden reduction in import tariffs due to increase in consumer prices harm the long term interests of our farmers since cheap imports tend to offset the commercial welfare of farmers. **As far as import policy for agriculture is concerned, it is often considered as a price support and price stabilisation tool, which is tilted more towards consumers.**

As an internal price control mechanism, trade policy is used to adjust tariffs to curtail any increase in consumer prices on an ad-hoc basis. Further, Minimum Export Price (MEP) is a frequently used tool to restrict or ban the export of a commodity with the intention in reaction to rising prices in the domestic market. In either case, the agenda is to control the supply of a commodity to the domestic market, the oversight being temporary and inconsistent in duration as contrived reactions to short term circumstances.

5.9.1. Formulating a long term Agricultural Trade Policy

The Foreign Trade Policy announced by the Department of Commerce usually takes a long term view (3 years at present). However, there is no corresponding long term Agricultural Trade Policy in the country. As a supply control mechanism, short term adjustments in tariff and export windows tend to disrupt any planning, or relationship building in international trade. Agriculture is already unpredictable, subject to vagaries of nature on the domestic front and markets uncertainties. A short term view of trade policy can only add further to the risks and uncertainties.

It is suggested that the agricultural trade policy should be guided by balancing the interest of both the producers and the consumers, in addition to long term food and nutritional security concerns of the country. A trade perspective over 5-10 years period is suggested. A mid-term planned review of agriculture trade policy is another important recommendation, akin to the mid-term review undertaken for foreign trade policy.

The trade policy can be structured on pre-determined signals, declared in a crop specific manner and for periods of the year, so that the trade can be accordingly planned for the long

term. For example, it can be declared that if the production of a particular commodity, at the time of first production estimates, is expected to be 10 per cent less than the moving average of the preceding three years, import tariff reduction of 5 per cent will be considered. Similarly in reverse, if the production expected is higher than 10 per cent of average, the export will be made free. The status would remain for a minimum of 6 months, unless the supply situation changes by another 15 per cent to the contrary. Different combination of parameters, specific to commodities, can be predetermined. Such pre-set triggers will allow the trade to make planned adjustments to supply dynamics and accordingly strengthen their links with trading partners abroad.

Government needs to reconsider agricultural trade policy and structure the mechanism such that the agricultural economy has more freedom to build external markets, which will benefit plans for productivity increases. Closure of export windows deprives producers from building long term targets for international trade. Export bans cause excess and long term disruption in planned export markets. Exports add a demand situation for domestic produce and provide an upward lift to the market price, which is advantageous to the farmers.

5.9.2. Current export status

India is among the largest producing countries in many of the produce such as cereals, fruits, vegetables and milk. Export is an important activity since it not only brings in foreign exchange to the country but also helps in improving remuneration to all stakeholders in the supply chain including farmers.

As per UNCOMTRADE, during 2014, the global production of various agri-horti products (where India has a strength) was as under:

Table 5.6 India global status in production

Figures in million tons

Product	World Production 2014	India production 2014-15	India share in production global (%)	Major producing countries in order of ranking
Cereals:				
Rice	711.99	157.20	22.07	China, **India**, Indonesia, Bangladesh, Vietnam, Thailand
Wheat	653.99	95.85	14.66	China, **India**, Russia, France, Canada
Maize	657.29	23.67	3.60	China, Brazil, Argentina, Ukraine, **India**
Sorghum	56.90	5.39	9%	Mexico, Nigeria, Sudan **India**, Ethiopia
Millets	27.68	11.42	41.25%	**India**, Niger, China, Mali, Nigeria
Animal Products:				
Hen Eggs	1191.00	79.94	7%	China, **India,** Mexico, Brazil , Japan
Buffalo meat	3.70	1.62	43.78%	**India**, Pakistan, Egypt, China, Nepal
Goat meat	5.28	2.10	39.77%	China, **India**, Pakistan, Nigeria, Bangladesh
Processed fruits and vegetables:				
Groundnut	39.40	6.55	17%	China, **India**, Nigeria, Sudan, Argentina
Cucumber & Gherkins	7.17	0.17	0.24%	China, Russia, turkey, Ukraine, Spain (**India-25th**)

Product	World Production 2014	India production 2014-15	India share in production global (%)	Major producing countries in order of ranking
Fresh fruits & vegetables:				
Banana	108.35	29.72	27%	**India,** China, Philippines, Brazil, Indonesia
Papaya	11.56	5.63	49%	**India,** Brazil, Nigeria, Indonesia, Mexico
Mango, Guava, Mangosteen,	44.27	18.43	42%	**India**, China, Thailand, Indonesia, Mexico
Apple	75.60	2.49	3%	China, Poland, **India,** Turkey, Italy
Grapes	63.92	2.59	4%	China, Italy, Spain, France, Turkey, Argentina, **India**
Oranges	61.28	7.31	12%	Brazil, China, **India,** Mexico, Spain
Pineapple	23.72	1.37	6%	Costa Rica, Brazil, Philippines, Thailand,. China, Indonesia, **India**
Citrus	12.08	0.74	6%	China, Nigeria**, India**, Columbia, Angola
Tomatoes	147.90	18.74	13%	China, **India**, Turkey, Egypt, Italy
Potatoes	349.93	46.39	13%	China, **India**, Russia, Ukraine, Germany
Peas Green	17.03	3.86	23%	China, **India**, France, Egypt, UK
Eggplant	49.06	13.58	28%	China, **India**, Egypt, Turkey, Indonesia

Though among the top producers globally, India also has a large population base and hence domestic demand is also equally large. However, as productivity levels and post-production activities and connectivity improve, there is scope for Indian agricultural produce to benefit from increased exports. On the whole, India is a net exporter of agricultural products.

Table 5.7 Trade balance in APEDA monitored products during 2016-17

Figures in $ million

Product Group	**Export Value**	**Import Value**	**Trade Surplus**
Cereals	6074	1343	4731
Animal Products	4416	69	4347
Processed Fruits & Vegetables	1070	3741	-2671
Other Processed Foods	3005	1241	1764
Fruits & Vegetables	1552	881	671
Floriculture & Seeds	161	118	43
Total	**16,278**	**7,392**	**8886**

It would help to appreciate, that Agricultural and Processed Food Products Export Development Authority (APEDA) monitored exports at US$ 16.27 billion in 2016-17, accounted for roughly 50 per cent of the total agri-exports of the country.

Further, of these exports, cereals and animal products share the major cake; and within these it is basmati rice and meat respectively. It connotes, that India's agri-exports are not yet broad-based, viewed particularly in the context of wide array of domestic produce. It simultaneously

implies that there exists large scope to pare up the quantum of exports and enhance the horizon of market opportunities for the farmer-producer.

Today Indian agriculture faces various new challenges such as stringent and every changing global sanitary and phyto-sanitary standards, lack of adequate post-harvest infrastructure and logistics connectivity, etc. Due to small land holdings, the produce from even a single village has significant variation in terms of varieties cultivated, size and other physical parameters and stage of maturity at the time of harvest. In view of this, it is difficult for the exporters to source requisite volume of a particular fruit or vegetables.

India's share in global export of agricultural commodities is about 2.2 per cent and the country is ranked 9th globally. The export of APEDA monitored products in last three years is as under:

Table 5.8 Export of APEDA products

Qty: '000 tons, Val: Rs crore

Product	2013-14		2014-15		2015-16		2016-17		CAGR (%)Value
	Qty	Val	Qty	Val	Qty	Val	Qty	Val	
Cereals	21065	63452	18414	58280	11945	40433	11825	40624	(5.02)
Animal Products	2112	32289	2163	33128	2075	30137	1895	29533	7.29
Processed Fruits and Vegetables	1082	6484	1007	6670	970	7213	880	7152	6.91
Other Processed Foods	2784	25068	3013	24893	2513	18855	2586	20112	(9.45)
Fresh Fruits & Vegetables	2917	8761	2500	7474	2405	8391	4116	10370	11.61
Floriculture & Seeds	40	866	35	888	33	973	33	1076	6.89
Total	**30001**	**136920**	**27133**	**131333**	**19942**	**106002**	**21337**	**108867**	**(1.64)**
$ bn value		**22.70**		**21.49**		**16.20**		**16.27**	

Recent trends indicate a plateauing out of exports in cereals and processed food products in volume and value, and demand for fresh fruits and vegetable growing in both quantity and value. For exports, the pre-requisites are surplus production, quality compliance with market parameters of residues of pesticides, matching large viable quantity with uniform maturity index and quality for the purpose of aggregation, sturdy and appealing packaging, good multi-modal logistics connectivity to exit ports, etc.

In order to meet all these requirements, there is need for farmer awareness about pre-harvest intervals (PHI) of various crops, judicious use of permitted and registered pesticides, harvesting at right maturity, appropriate post-harvest infrastructure facilities such as modern pack-houses, reefer transportation, processing facilities where needed, certified packaging, etc.

Global demand for agricultural products: An assessment of the market demand at global level, indicates that India has little presence in many of the top importing countries. The situation for some select products is represented in the following table.

Table 5.9 Global import and India's share

Product	Global import - $ bn	India's share - $ bn	Top importing countries	Top exporting countries
Cereals:				
Sorghum	0.03	0	Mozambique (66.66%); Barbados (33.33%)	Zimbabwe, USA, South Africa
Maize	31.90	0.18	Korea Republic (13.87%); Japan (10.10%); Mexico (7.57%); Czech Republic (7.12%); Egypt (5.60%)	ÙSA, France, Brazil, Argentina, Poland, Ukraine
Animal Products:				
Poultry meat	2.5	0.013	Saudi Arabia (9.55%): UK (7.78%); Japan (7.19%); Hong Kong (6.55%); France (5.11%)	Brazil, Netherlands, Germany, USA, Belgium
Milk Powder	5.00	0.030	China (12.11%); Hong Kong SAR (10.85%); Algeria (8.04%); Mexico (5.12%)	Netherlands, France, New Zealand, Germany, Denmark; Sweden, USA
Cheese	16.18	0.003	Germany (17.39%); USA (7.04%) UK (6.33%); Italy (5.73%); France (5.25%)	France, Germany, Italy, New Zealand, Netherlands, Belgium UK
Processed Fruits & Vegetables				
Cucumbers & Gherkins	0.43	0.18	Canada (9.2%); USA (9.2%); Germany (8.52%); France (8.30%); France (8.3%)	USAQ, India, UK, Germany, Turkey, Vietnam
Other Processed Foods				
Sweet Biscuits	7.19	0.103	USA (13.15%); France (7.39%); UK (6.26%); Germany (6.01%); China (4.24%)	Canada, Mexico, Germany, UK, Belgium, Netherlands, Poland
Wine	2.57	0.003	USA (16.82%); UK (13.57%); Germany (8.23%); China (6.10%); Canada (5.98%)	Italy, France, New Zealand, Spain, USA, Chile
Infant food	8.99	0.010	China (28%); Saudi Arabia (7.25%); UK (6.03%); China Macao SAR (3.54%); Germany (3.52%)	Germany, Netherlands, Ireland, Thailand, Singapore, USA
Cassava	0.08	0.002	USA (21.95%); Korea Republic (8.54%); China (8.45%); France (6%); Czech Republic (4.88%)	Thailand, China, Indonesia, Other Asia, USA
Starch	3.65	0.07	China (22.95%); Indonesia (9.70%); USA (6.08%); Other Asia (5.09%); Korea Republic (4.88%)	Vietnam, China, Germany, France, Thailand, Denmark, Netherlands
Fruits & Vegetables				
Tomatoes	6.4	0.07	USA (24%); Germany (15.27%); Russia (8.01%); UK (7.60%); France (7.30%)	Mexico, Netherlands, Japan, Italy, Spain
Potatoes	2.75	0.069	Netherlands (9.28%); Belgium (8.40%); Russia (8.39%) Germany (5.44%); Spain (5.26%)	France, Netherland, Egypt, Germany, Spain, China,
Bananas	11.60	0.020	USA (17.28%); Belgium (8.08%); Germany (6.95%); Russia (6.52%) Japan (6.04%)	Ecuador, Philippines, Costa Rice, Guatemala Columbia

Product	Global import - $ bn	India's share - $ bn	Top importing countries	Top exporting countries
Grapes	8.36	0.17	USA (18.26%); UK (8.05%); Germany (7.89%); Netherlands (7.55%); China (7.01%)	Chile, USA, Italy, Netherlands, Spain, South Africa, India
Mandarins	4.21	0	Russia (14.54%); France (9.85%) Germany (9.84%); USA (9.53%); UK (9.08%)	Spain, Turkey, Morocco, Chile, South Africa
Mango, mangosteen and guava	2.41	0.48	U SA (22.50%); China (10.76%); Netherlands (9.64%); Germany (7.03%); UK (6.74%)	Thailand, Brazil, India, Pakistan, Peru, Philippines, Indonesia
Pineapple	2.41	0.004	Usa (27.95%); Netherlands (6.35%), Germany (5.77%); UK (5.73%); Belgium (5.15%)	Costa Rica, Netherlands, Mexico, Other Asia

Source: UNCOMTRADE (Update as on 15.01.2017)

An export strategy may require to include cluster based development such that FPO or VPO are able to output sizeable volume of quality produce as desired by the importing markets. Availability of a particular fruit or vegetable in significant quantity with similar physical parameters and stage of maturity at the time of harvest is critical, especially when the produce is required to undergo some post-harvest pre-conditioning like vapour heat treatment or hot water treatment in compliance of the importing country's requirements. Export oriented production through development of clusters will help to make available sizeable volumes of identified produce to meet such requirements.

APEDA (Agricultural and Processed Food Products Export Development Authority in the Ministry of Commerce) has in association with the Department of Agriculture, Cooperation & Farmers' Welfare, initiated a cluster approach, by identifying contiguous geographical farm lands and develop the farmers to address the issues raised in cultivation (quality planting material, integrated pest and nutrient management, etc.), pre-harvest (maturity indices, permissible residue levels, etc.) through agencies of the state governments. The concerns in the post-harvest handling and export linkage can be addressed through the Central government agencies.

There is also the need to designate specific sea-ports as gateways for export /import of agricultural produce, especially those that are perishable, such that the necessary phytosanitary clearances are fast-tracked and do not become a bottleneck to movement.

5.10. Futures Trading

'Commodity Futures' and 'Derivatives' have long been recognised as instruments for risk management through forward pricing. The Futures markets, not only provide an alternate marketplace for the farmer but most importantly help the farmer address price risk by helping to lock in a price.

There are two ways by which farmer association can hedge on the Futures platform.

- one, by hedging price on futures platform and delivering goods through exchange approved warehouses; and
- second, by hedging price on futures platform and later squaring off the position and selling goods in the spot markets.

However, the Futures markets and exchanges suffer from inefficiencies. Several factors attribute to the inefficient functioning and retard the growth of futures market like-

- thin volumes and low market depth,
- infrequent trading, lack of effective participation of trading members,
- not having a well-developed spot market in the vicinity of futures market,
- poor physical delivery in many commodity markets,
- absence of well-developed grading and harmonised standards, and
- other market imperfections.

Futures market needs to be developed to provide as an alternative marketing channel for farmers. This requires to link farmers to exchanges through farmer producer organisations including farmer producer companies. The steps in this direction are:

i. Enable participation in transparent and efficient regulated exchange

Exchange-traded forwards overcome the limitations of futures (time, place, quantity and grade of produce) and offer farmers direct access to national buyers, with reduced counter-party risk. As a result, farmers can secure improved income realisation and avoid distress sale by using the Exchange warehousing and financing infrastructure.

Indian farmers are buffeted by price volatility and in such a situation, options can be the ideal instrument for insuring their margins. Farmer producer companies and cooperatives can be encouraged to use options to manage commercial risk in the production, processing and marketing of agricultural products. Forwards along with options can provide farmers with an appropriate tool to get good price for their produce and manage price risk efficiently.

ii. Remove entry barriers for farmer participation on exchanges

Farmer participation on futures is limited due to the entry barriers in the form of membership criteria, stringent KYC norms, margin requirements, etc. By making it easier and simpler for farmer producer companies to take membership of exchanges, farmers can be encouraged to formal, regulated, cash-less markets.

By lowering the threshold for membership for FPCs through a special membership category, simpler KYC and permitting margin financing for farmers, more such companies can be encouraged to connect to exchanges to lock in prices and cover their risks.

iii. Boost warehouse-based sales and commodity finance

Encouragement of crop inflow into transparent and regulated warehousing network can be commenced with exemption of the 450 exchange-approved warehouses from Stock Control Order under the Essential Commodities Act. Additionally, the new WDRA regulated repository can encourage a pan-India digital network licensed warehouses and provide the legal and regulatory environment for inventory financing and warehouse receipt lending to encourage the use of these financing mechanisms.

All e-Negotiable Warehouse Receipt (eNWR) based financing provided to farmers should be considered as priority sector lending and banks should be mandated to provide credit to the agri-sector compulsorily through eNWR. A default guarantee structure under WDRA can give further confidence to banks and boost agri-financing.

iv. Improve competitiveness of small and marginal farmers through aggregation

For small farmers, the advantage of joining a collective are the direct and indirect access to a market (local, regional, global); a transparent pricing mechanism, that is linked to demand; scope to shift away from mono-cropping low-value to high-volume crops; avoiding over-reliance on credit to purchase inputs; leveraging a competitive advantage in production, quality certifications; and, credibility of the buyer and trust among farmers via regular direct interaction between the buyer and the farmers. There is also the need to invest resources in capacity building for financial and managerial skills as well as improved corporate governance.

v. Expand the digital Mandi network

By July 2017, as many as 455 markets across 13 States have joined the e-NAM platform initiated by the government of India. Further, 150 markets have joined the Unified Marketing Platform (UMP), under Rashtriya e-Market Services Limited (ReMS), a joint venture of Karnataka Government and NeML. By March 2018, NAM will have 585 markets integrated via the e-NAM platform, creating inter-operability between these two networks. This will take the total number of markets that can conduct online trade to almost 750. The Model APLM Act 2017, provides for multiple online platforms.

Inter-operability that will create a network of all these platforms, will be to the farmers benefit by providing competitive price discovery.

5.10.1. Integrating the physical, derivatives and input markets

There are three types of markets in the ecosystem that a farmer has to deal with. One, for selling his produce, he needs access to physical or spot markets, and lack of such an access is one of the major impediments for smallholders. Local rural markets are thin and dominated by agents whereas trading in distant markets is not remunerative owing to high transportation and transaction costs. Besides, the farmers also face problems in gaining access to credit, high quality inputs, improved technology, information and services.

Second aspect relates to the input market. Agricultural inputs and related services are the basic

requirements for agricultural sector. Raising the farm productivity depends on the quality of farm inputs and services. The steady and timely availability of farm inputs and service is very much required in order to increase agricultural growth and welfare of farming community.

Third relates to the agricultural derivatives market. Farmers do participate in the futures market, both indirectly as well as directly. They take advantage of the price signals emanating from a futures market that helps them to take decision about cropping pattern and the investment intensity of cultivation. The farmers also benefit by the dissemination of the futures prices of the Exchange traded products as it improves his bargaining capacity.

The larger lot sizes of futures contracts remains a challenge for smallholders to participate directly. However, the situation is changing slowly but steadily. With the emergence of FPOs and their increasing awareness, they are now able to hedge their price risk well in advance of the start of harvest seasons. With commodity options being available soon, farmers will be getting another instrument to hedge their risk which is cheaper and more efficient. Options would give the farmers benefit of price protection in case the price falls below their cost of production, as well as the benefit of any rise in price. This would be a better instrument for farmers than futures. All these markets being very critical for smallholders, are required to be integrated so as to serve the farmers in a holistic manner.

There must be a formal institutional mechanism that integrates these three markets with a concrete intention of making farmers successful and making agriculture sustainable for them. When derivatives market gets scaled and becomes completely integrated with physical market, the benefits of derivatives market gets integrated to physical market and in turn to farmers then it results in real empowerment of farmers.[14]

The integration of the spot market with the exchange is expected to add value through risk hedging and capturing better prices. There will be need to develop harmonised set of standards and quality grades to make such integration fully effective for seamless trade across platforms.

A report by NICR (an NCDEX group company) reports that farmer producer companies and cooperatives have emerged as viable aggregation vehicles for small and marginal farmers to participate directly on the NCDEX platform to realize better prices and manage risk through informed judgement. In the last 18 months, NCDEX has reached out to more than 275,000 farmers belonging to 177 farmer collectives. Farmers have received 15-25% higher net price realisation. This is in addition to the 3% savings in costs from direct market access. The higher income was made become possible through a range of multifaceted developmental activities undertaken by NCDEX to upgrade post-harvest practices and other capacity building. Farmers were motivated to undertake primary post-production activities to segregate by quality grades and were able to capture added value. Around 47,000 small and marginal farmers have successfully hedged their crops on exchanges in the last year or so (2016-17) and 1.29 lakh

[14] NICR- Role of commodity derivatives in doubling farmers' income, June 2017

farmers have opened account with the exchange. This is indicative of positive response of farmers to futures trading.

5.11. Annotation

The erstwhile architecture of the marketing network does not abet the element of market to market competition. Farmers within the captive catchment of a market have no choice but to undergo exchange at prices influenced by supply to the locally determined demand.

The previously understood metric of desired market density was construed to mean having a market every 5 km of distance. However, the interpretation was derived from a maximum travel time of one hour from farms to markets. With today's network of rural roads, the one hour travel time for farmers can vary from 20 km to 40 km depending on terrain.

The Royal Commission on Agriculture (1926) held view in its report of 1928, that a twelve mile radius (19 km) represented the limits within which agricultural produce can easily flow to a market centre, when referring to direct marketing by a cultivator when transporting by own cart. Emphasis was placed on urgent need to improve roads, in order to facilitate carriage by cart and, to render great extension of motor transport.

The current network of markets are advised to upgrade into an architecture that allows assembly and aggregation of produce, to interconnect with the one-nation, one-market system.

For improved linkage with domestic and international markets, as well for streamlining online trading, a pre-requisite is to have harmonised standards and quality grades.

Key Extracts

- A new market architecture is recommended to inter-connect the existing locations and allow for a seamless flow of produce to various demand centres.
- The market density is governed by travel time and not merely the geographical are covered. The entire country is the market, limited only by logistics connectivity.
- FPO must factor in the grouping together of adjoining farm land and not merely bringing together of individuals. The ills of fragmented land holding can be countered by promoting clubbing of contiguous land to take up cluster farming at village level.
- A predictable and stable agriculture trade policy, is recommended to develop long-term market relationships.
- Futures market can be developed to provide an alternative channel, especially for village/farmer producer organisations.

Chapter 6
MSP and Procurement

There are structural constraints in the way agriculture is performed and has been understood in the country. While an efficient and effective marketing system will benefit the farmers better, given the small individual quantities of marketable surpluses and less than perfect market conditions in reality, price and market support will continue to be sine-qua-non. It is critical, that these two are strengthened.

Among various factors, farmers' welfare is also hinged to their earning optimal and positive net returns from agriculture. This necessitates realisation of remunerative prices on the produce. Given that an ideal market situation, particularly in the agricultural sector, is difficult to achieve, non-market interventions in support of the farmers become inevitable.

Price support, and procurement whenever the prices in the market become less than remunerative, serve as effective interventions. These are two sides of the same coin – remunerative price for the farmers' produce. In a way, while price support indicates the intention of the government, market support though procurement shows its intention in action.

6.1. Price Support in Agriculture

The success of green revolution launched in the second half of the 1960s was predicated upon the triangular policy of high yielding seed, robust extension service and assured market support. As well known, green revolution began its journey from the irrigated belts of Punjab, Haryana and Western Uttar Pradesh and was largely limited to wheat and paddy. Assured procurement of these two crop-commodities linked to Minimum Support Price was a powerful incentive for the farmers, who adopted new seed and the associated basket of technology that went with it.

Till the mid-1970s the Government notified two types of price support, namely, (i) Minimum Support Price (MSP); and (ii) Procurement Price. MSP was intended to serve as a floor price and an assurance against risks that could arise from sharp falls in market price. On the contrary, the procurement price was to undertake domestic purchases of cereals by public agencies, for the purpose of the Public Distribution System. Normally, procurement price was higher than MSP, but lower than the open market price. This provided the farmer the choice to avail of either the market price, or sell to the public agencies. In fact, MSP was a benchmark price that was meant to address the farmers' risks.

Subsequently and as in practice today, MSP itself is the Procurement Price and is used as a market price benchmark. Government notifies MSPs annually for 23 commodities inclusive of 14 kharif, 7 rabi and 2 calendar year season crops. In addition to these 23 crops, Government also notifies Fair and Remunerative Prices (FRP) for sugarcane and jute.

The Government notifies MSPs based on the recommendations of an independent body, called Commission for Agricultural Costs and Prices (CACP). The CACP adopts a scientific approach to calculation of the cost of cultivation and the data for this is provided by a field

survey conducted by the Directorate of Economic and Statistics (DES) in the Ministry of Agriculture & Farmers' Welfare. The recommendations of CACP currently take into account various factors like cost of production, changes in input price, trends in market prices, demand and supply situation, inter-crop price parity, effect on general price level, effect on cost of living, international market price situation, etc. In addition, the Commission also studies expected impact on nutrition and the imputed value of family labour.

The CACP finally considers all paid out costs in respect of the above variables, called A2 and the imputed value of family labour. Thus, CACP recommendation is a function of:

A2 = Actual expenses in cash and kind, including rent paid for leased-in land.
FL = Imputed value of family labour

Further, CACP adds a certain percentage of the A2 cost as a profit margin and this together is recommended as MSP to the Government.

Table 6.1 Percentage margin of profit on A2+FL for the year 2016-17

S.N.	Commodity	MSP Rs./quintal	A2+FL Rs./quintal	Current % Margin (in practice) over A2+FL
Kharif Crops				
1	Paddy	1470	1045	40.7
2	Jowar	1625	1501	8.3
3	Bajra	1330	925	43.8
4	Maize	1365	966	41.3
5	Ragi	1725	1733	-0.5
6	Arhar (Tur)^^	5050	3241	55.8
7	Moong^^	5225	4065	28.5
8	Urad^^	5000	3584	39.5
9	Cotton	3860	2889	33.6
10	Groundnut in shell*	4220	3371	25.2
11	Sunflower seed*	3950	3479	13.5
12	Soyabeen*	2775	1852	49.8
13	Sesamum^	5000	4188	19.4
14	Nigerseed*	3825	3366	13.6
Rabi Crops				
15	Wheat	1625	797	103.9
16	Barley	1325	816	62.4
17	Gram^	4000	2241	78.5
18	Masur (Lentil)!	3950	2174	81.7
19	Rapeseed/Mustard*	3700	1871	97.8
20	Safflower*	3700	3049	21.4

* Including bonus of Rs. 100 per quintal.
^ Including bonus of Rs. 200 per quintal.
^^ Including bonus of Rs. 425 per quintal.
! Including bonus of Rs. 150 per quintal

The Government notifies the MSP after due consideration and makes necessary changes as it deems appropriate in the interest of the farmers. In the last few years, in order to incentivise

the pulse producers and raise the total output in the country, the Government has been providing attractive bonus over and above the MSP for pulses.

Based on the MSPs notified by Government for the year 2016-17, percentage margin of profit on A2+FL (as in vogue now) in respect of 14 kharif crops and 6 rabi crops work out as in column 5 of the Table 6.1.

There has been a debate on the pros and cons of considering a different costing method, where Cost C2 would be the basis for determination of MSP by the CACP. Cost C2 would include the rent paid for any leased-in land, imputed rent for the owned land, interest on owned fixed capital, and imputed value of wages to family labour, in addition to the Cost A2.

There is also an ongoing debate regarding adding 50 per cent of Cost C2, as the profit component, to determine the MSP.

An examination of the table 6.1 shows that the profit margin

- is ≥ 50% in case of 6 crops, namely, arhar, wheat, barley, gram, masur and mustard. In fact it is much higher in case of wheat (103.9%);
- is ≥ 40% < 50% in case of 4 crops, namely, paddy, bajra, maize and soybean;
- is ≥ 30% < 40% in case of two crops, namely, urad and cotton;
- Is ≥ 20% < 30% in case of 3 crops, namely, moong, groundnut in shell and sunflower;
- is < 20% in case of 4 crops, namely jowar, sunflower seed, sesamum and niger seed; and
- is negative in case of ragi.

Crops for which Minimum Support Prices (MSPs) are fixed

Kharif crops	Rabi crops	Calendar year
Paddy	Wheat	Copra
Jowar	Barley	De-husked coconut
Bajra	Gram	Jute
Maize	Masur (Lentil)	
Ragi	Rapeseed/Mustard	
Arhar(Tur)	Safflower	
Moong	Toria	
Urad		
Cotton		
Groundnut in shell		
Sunflower seed		
Soyabeen		
Sesamum		
Nigerseed		

The list of crops for which it recommends MSP does not include toria (rabi season) and dehusked coconut (calendar year crop). In case of these two, Government calculates the MSP by linking toria to rapeseed / mustard and dehusked coconut to copra.

6.1.1. Making MSP more effective

NITI Aayog, in its study covering 36 districts in 14 States, found that a low proportion of farmers (10 per cent) was aware of MSPs before the sowing season; 62 per cent of the farmers were informed of MSPs after sowing their crops. The pricing policy of MSPs would be effective only if farmers are aware of it at the time of deciding what crops to grow. Some of the observations of the study are as follows:

(i) Awareness among the farmers on MSP needs to be increased and the information should be disseminated timely, till the lowest level, so that the knowledge would increase the bargaining power of the farmers.

(ii) Delays in MSP payments have negative effects on the farmers and needs to be corrected to ensure timely payments.

(iii) As intended by the policy makers, MSP should be announced well in advance of the sowing season so as to enable the farmers to plan their cropping.

(iv) Improved facilities at procurement centres, such as drying yards, weighing bridges, toilets, etc. should be provided to the farmers. More godowns should be set up and maintained properly for better storage and reduction of wastage.

(v) There should be meaningful consultations with the State Government, both on the methodology of computation of MSP as well as on the implementation mechanism. The criteria for fixing MSP should be current year's data and based on more meaningful criteria rather than the historical costs.

(vi) The small and marginal farmers can be provided with some exemption in Fair Average Quality (FAQ) norms to provide them with a source of income. The Procurement Centres should be in the village itself to avoid transportation costs.

(vii) The MSP scheme requires a complete overhaul in those States where the impact of the scheme ranges from 'nil' to 'at-best marginal' to ensure that MSP as an important instrument of the Government's agricultural price policy is not undermined. In fact, in a few selected States in Eastern India (for instance, Assam and West Bengal), the poor impact of the scheme may be judged by the fact that none of the selected farmers were even aware of the existence of such a Scheme.

6.2. Market Support in Agriculture

Minimum support prices acquire value only when they are supplemented by a robust mechanism of procurement, whenever they are breached in the market on the negative side. The experience so far exhibits that procurement has largely benefited wheat and paddy growers and almost 33 per cent of the marketed surplus is procured. The procurement of other MSP notified commodities has not been very encouraging. It is only over the last 3 years, that pulses have come to be procured more substantively. The year 2016-17, saw a record pulse procurement of nearly 2 million tons at MSP.

It is well established, that the status of procurement linked to MSP has not been secular either

in terms of crops covered or geographic spread. Taking for example, in case of wheat, of the average of 33 per cent of marketed surplus procured, 90 per cent is accounted for in Punjab, Haryana and Madhya Pradesh. However in case of paddy, due to introduction of decentralised procurement the area coverage has increased to more number of states, beyond Punjab and Haryana over the recent years.

In the opinion of this Committee the farmers would gain better from a more robust system of procurement rather than increase in MSPs. While this Committee emphasises on the important role of markets in transferring remunerative prices (that are more than MSP) to the farmers, by creating an efficient market system (refer to chapters 4 and 5), it also recognizes that world over, marketing in general and agriculture marketing in particular cannot be perfect or even near perfect in the classical sense. It would be impractical to expect ideal market conditions, therefore, farmers' welfare warrants that Government demonstrates a more visible commitment to procurement across all MSP notified crops, and more particularly in case of pulses, oilseeds and nutri-cereals like sorghum, bajra, etc. This would in a way be a replay of the price & market support that paddy & wheat benefitted from, for the other crops that are more suited to less endowed production environments.

It is therefore recommended, that in addition to strengthening the existing procurement schemes, more such tools be developed and deployed to enhance the support and reach across the country and across crops, besides improving the speed of response and effectiveness of procurement in cases where prices may drop below MSP.

6.2.1. Procurement Bouquet

The existing procurement mechanisms by the government are implemented under:

- **Price Support Scheme (PSS)**
  - Applicable in case of MSP notified crops
  - Intervention by DAC&FW, GoI whenever market prices fall below MSP.
  - Initiated at the request of State governments, conditional upon agreeing to abide by PSS guidelines (waiver of mandi fee; gunny bags; general support).
  - Procurement limited to 25 per cent of State production estimates; but can go beyond the norm with approval of the central government.
  - Procurement by central agencies – NAFED, SFAC, FCI.
  - Open to all notified crops, but operations have been limited to pulses, oilseeds and cotton; however other crops can be assigned by government.

- **Market Intervention Scheme (MIS)**
  - To support commodities, for which MSPs are not notified - fruits/vegetables/other horti-products.
  - Owned by GoI (DAC&FW), but operated jointly by Central & State governments, in the interest of farmers.
  - Market intervention made if prevailing market prices less than 10 per cent or

production more than 10 per cent compared to the corresponding figures in the previous year.
- Initiated at the request of state governments, on they agreeing to bear 50 per cent of procurement cost.
- GoI bears 50 per cent of procurement price (fixed by it based on cultivation cost determined by technical committee), and overhead charges.
- Disposal, a responsibility of the State government. Profit, if any allowed to be retained by the state.

- **Price Stabilisation Fund (PSF)**
  - A scheme to protect consumers from rising prices.
  - Owned & operated by the Department of Consumer Affairs (DoCA), GoI.
  - The scheme aims at building buffer stock of pulses by purchasing from the domestic market at prevailing market rate (could be more or less than MSP). Even imports allowed.
  - In the year 2016-17, domestic procurement of 16.46 mmt of pulses at MSP undertaken in the interest of farmers-producers by a special order of the government.

- **Food Corporation of India operations for Central Pool.**
  - Wheat and paddy is procured
  - Procurement is made to meet buffer norms and for meeting targets of the public distribution system.
  - Long experience of nearly 50 years in procurement and buffer stock management to meet the demands of National Food Security Act; and Open Market operations.

Some observations on the current state of procurement implementation

- FCI intervention for procurement of wheat & paddy through its direct purchases and through decentralised procurement operations results in substantive benefit to the farmers, as an average of 33 per cent of the marketed surpluses of these two staple cereals is purchased at MSP.
- PSS operation in case of pulses is beginning to pick up momentum only recently. In 2016-17, total procurement accounted for about 8 per cent of the total production but works to about 10 per cent of the marketed surplus. However, procurement of oilseeds at 0.66 per cent of the total production remained still low.
- Procurement of perishables under MIS is still negligible.

It is however, seen that market interventions made to procure the produce, do help in creating a more buoyant price situation in favour of the farmers.

6.3. Broad-basing Procurement Interventions - New Initiatives

6.3.1. Market Assurance System (MAS)

Paddy and wheat constitute the dominant cereals produced in the country. Of the total cereals output of 251 million tons in the year 2016-17, paddy at 109 million tons and wheat at 97 million tons accounted for a total of 206 million tons or 82 per cent of cereals. The public distribution system that caters to the consumer welfare under National Food Security Act entails automatic procurement of these two staple cereals.

In respect of other agri-produce, there is no such auto-trigger. The market interventions under PSS and MIS are implemented only on the request of the States/UTs, on the basis of certain conditionality in market scenario and such intervention may not be timely, since there is a time lag between the reaction time of the State to the market scenario, sending the request to the Centre for approval and waiting for the green signal to commence actual procurement. This time lag itself may create further download pressure in the market and undue advantage to the traders, who can purchase at low prices & stock it to make a windfall gain later.

There is need for a market intervention scheme which allows quick assessment of the local market situation and preparedness to enter whenever and as soon as when the prices start dipping below the MSP. This is possible if both the deciding authority and the procurement authority is one and the same.

Towards making such farmer-friendly interventions more meaningful, there is the need to ease certain processes that impede a rapid response mechanism. Therefore, a new instrument called **Market Assurance System** (MAS) is proposed, whose main features are:

(a) The scheme will be directly under the State Government who can take immediate decisions on basis of local conditions, to enter the market and begin procurement through their own State agencies or any other private agency authorised by State government. State governments may also request the NAFED to procure directly on their behalf if other robust arrangements at State level are not available.

(b) Procurement can be initiated from the farmers directly, for MSP notified commodities (except wheat and paddy), if the prices dip below MSP. States can therefore assure the farmers of procurement if the prices dip below MSP.

(c) It shall be the responsibility of the State/UT government to procure and liquidate the procured commodity. The liquidation options would be by release into the PDS, MDM, ICDS, Hostels and ration for the State police force etc; by sale in markets; or through exports (in line with extant GoI trade policies). The profits, if generated, can be retained by the State Governments and ploughed back into a specially created corpus fund.

(d) The States would create a corpus fund for this purpose and make all logistics arrangements to handle the procurement. The support of the Central government to

the States/UTs shall be to compensate the operational loss, if any, on value of MSP, upto a maximum of 30 per cent in general areas and 40 per cent in case of North East & Himalayan States. The procurement date and MSP notified for the commodities for the year of procurement will be used to evaluate the support.

(e) Preliminary calculations show that the Central government support of 25 per cent of MSP would be an adequate incentive for the State Governments to undertake such procurement. These calculations based on 2015-16 MSP are shown below:

(i) The procurement cost includes the costs of gunny bags, loading and unloading charges, commission of various agencies and market fee works out to about 8 per cent of MSP.

(ii) Assuming that the stock is held for a certain period (normally a wait of 6-9 months would be a good period to realise higher market prices), the carrying cost per month of the procured stock would be around 1 (one) per cent of MSP. If the stock is stored for nine months, the average carrying cost would be 9 (nine) per cent.

(iii) Assuming that procured quantity of pulses (for eg.) is sold after nine months at prices which are 8 per cent below MSP, the total cost of procurement operation works out to 8+9+8 = 25 per cent of MSP. An additional 5 per cent is suggested to meet miscellaneous & unforeseen expenses, which takes the indicative support to 30 per cent as compensation.

(iv) In case of NER and Himalayan States, a further latitude of 10 per cent is suggested as response to relatively more difficult situations that exist.

Hence, the Central government's assurance of providing support for a maximum of 30 and 40 per cent of the value of MSP to the State/UT governments (as the case may be) based on actual procurements seems to be adequate to incentivize the intended decentralised market assured price & procurement operations. Some of the advantages of such a scheme are:

i. It is a decentralized system operated by the State governments, wherein they have the flexibility to decide timely response to falling markets and engage different agencies to undertake quick and timely intervention.

ii. The State Governments will have the flexibility to discharge the procured commodities in the manner they find it most suitable.

iii. The liability of the Central Government will arise only if the States incur losses. In all probability the stock is likely to integrate into captive channels like PDS, Mid-Day Meal Scheme, ICDS programme, ration distribution scheme for Police and similar other State requirements.

iv. This will be a more broad-based market intervention with the strength of Centre and State pooled for the needed deployment resulting in coverage of more farmers with advantage of closely monitored efficiency at implementation level.

v. The scheme holds the potential of favouring the cropping systems that need to be encouraged in alignment with the local agro-ecological and climatic zone requirements.

Through this proposed mechanism, the respective State/UT governments will be in an improved position to take prompt and effective action to manage any market disruption in the agricultural sector. Procedural delays for approvals will be alleviated. The operational guidelines for the MAS can be finalised in consultation with State governments and revisited through a monitoring committee every few years.

6.3.2. Private Procurement & Stockist Scheme

All the existing schemes including FCI operations, PSS, MIS and PSF as also the newly proposed MAS are primarily government owned and driven schemes. The purpose of any non-market interventions should be to offer not only the price support to the farmers, but also market support which means intervention by way of procurement in case of price falls, by purchasing the farmers produce at pre-notified MSP. This should go along with the need to provide the farmer a safety net of minimum support on his produce.

There are no studies that suggest the minimum percentage of the marketed surpluses that should be procured to ensure market stability. However, it has been experienced that the trends of falling prices are reversed whenever government makes procurement interventions. It is suggested that assured procurement for important crop categories should be substantive enough to influence the market prices. The table below shows the percentage of procurements against total production for important crops/crop categories:

Table 6.2 Status of production, marketed surplus and procurement for the year 2016-17

SN	Crop / Commodity	Total production (in million metric tonnes)	Marketed Surplus Ration (MSR) for the year 2014-15	Procurement Ops.		Percentage of procurement against total production
				Agency	Quantity (mmts)	
1	Paddy/Rice	108.85	84.35	FCI	38.65	35.51
2	Wheat	92.30	73.78	FCI	22.96	24.88
3	All pulses	22.41	85.56 to 94.38 (vary across pulses)	NAFED (PSS, PSF)	17.50	7.79
4	All Oilseeds	32.52	71.00 to 100 (vary across oilseeds)	NAFED (PSS)	0.22	0.66

The previous table amplifies the high threshold of procurements achieved in case of paddy & wheat and in contrast low levels in case of pulses & oilseeds as a group. It is suggested, that

the thresholds of procurement for pulses, oilseeds and other cereals (other than wheat & paddy) should be raised to 15, 10 and 5 per cent of the marketed surpluses, and not of the production. However, it may be appropriate to conduct a study and determine the ideal threshold levels, that will help stabilise market prices.

In order to achieve such higher percentage of procurement, it is necessary to bring in private sector players to supplement the government led schemes. Hence, the Committee recommends that the MSP linked procurement be opened to private sector where the designated / empanelled enterprises chosen through a transparent bid/empanelment process are allowed to enter the market for purchase of the farmers' produce at MSP. The guidelines framed should take care, that the markets are not manipulated artificially to create a lower than MSP market situation and purchase at MSP to earn undue profits subsequently. It is hoped, that an efficient marketing system and information access to the farmers will make them well informed sellers and will, therefore, exercise the discretion to sell or hold back their produce.

Such private enterprises can be selected on the basis of their track record, corporate governance, management of agricultural produce and their targeted investments in the market procurement. The criteria need to be developed in such a manner that any number of enterprises are crowded in to participate, so that no monopoly practices are adopted that can create adverse fluctuations in the market.

The private sector players will function alongside the on- going government interventions and help broadbase procurement operations. A well designed and closely monitored private sector intervention can be made to serve the cause of consumers' welfare and farmers' welfare without an additional burden on the government exchequer. The government to that extent will also be released of inventory management as it shall be the responsibility of the designated agency to dispose of the procured commodities in the manner it wishes to, within of course the agreed framework. Such an intervention may be particularly required in regions with production surpluses but there exists no effective demand. In such areas private sector led procurement operations will create a demand and possibly influence the market positively. In such areas, the private trader should promote warehouses, processing mill (pulses / oilseeds), so that it is the processed product that is transported and not just the raw produce. Such private enterprises can be selected on the basis of their track record, corporate governance, management of agricultural produce and their targeted investments in the market procurement. The parameters need to be developed in such a manner that any number of enterprises are crowded in to participate, so that no monopoly practices that can adversely create fluctuations in the market, are probable.

Since the engagement of private sector would be conditional upon procurement at MSP, a well-designed and transparent, incentive and duty framework may be developed. The suggested contours of the proposed scheme are as follows:

i. Each private sector entity would be free to procure MSP notified commodities from farmers at prices not below MSP, through a transparent e-market platform, on notifying

the designated authority.

ii. The minimum quantity of procured commodity would be linked to the net worth of each private entity.

iii. The procured quantity would be maintained under the direct management of the procuring agency.

iv. To make the operations financially sustainable, the selected entities will need to operate "for-profit". In view of this, the determination of storage, time and place for disposal, and selling prices may solely be that of the private entity at its discretion.

v. The declared quantity procured be free of any control orders, including stocking limits. There shall be no government interference in holding/disposal of their stocks, except in accordance with the conditions as laid down in the Agreement.

vi. The quantity procured at MSP by these entities may be considered to be exempted from import/export restrictions, such as minimum export price (MEP) or import bans. This will enable the entities open up the markets during bumper production and import freely during shortages. If such an open permission is held not to be feasible, then an annually agreed import-export structure may be considered.

vii. Once procured, the stocks will be held by the private entity and sold/exported at the full discretion of the entity. The stock can also be liquidated to FCI or State agencies to meet public distribution requirements.

viii. To incentivise the private entities, Government may like to consider some percentage of concession on the income tax. In order to regulate such concession, the private entity should be required to maintain a transparent and audited statement of gains and losses, segregated from its other business(es). Another condition that may be required is eligibility for such a concession, till such time as the profits are retained in the procurement account.

ix. The procurement entities will be given priority for receiving subsidy for expanding and creation of agri-infrastructure under any existing schemes of the government.

x. The agencies may be allowed to procure grains, pulses, oilseeds, spices, cotton, potato and onion.

Government may also consider such other incentives like concessions on freight charges, lower GST on hired godowns, etc. The Government may develop suitable guidelines to this effect.

A similar mechanism can be also developed for the more perishable fruits and vegetables produce. However, the perishable crop segment has a faster selling cycle and shorter holding periods, and hence procurement of such crops would require farm produce marketing organisations (FPMOs) to participate, rather than stockists.

6.4. Annotation

The farmer's welfare hinges on the effectiveness of the market system, as well on the timely and effective market support by government. Government market support has been substantial, mainly in case of wheat and rice through the assured public procurement mechanism for the Central Pool stocks, but typically limited to the benefit of farmers in a few States.

The Committee felt that the procurement based support system can be spread into other regions and crop types, while not adding to the overall cost to exchequer. Increasing the coverage of market interventions will appropriately broaden the intended impact, by distributing value to more farmers and motivate productivity across regions.

Market interventions are also triggered by price linked eventualities. The extent and time of any market intervention should aim also at normalising the fluctuations in market prices and more importantly the downslide of prices due to temporal post-harvest gluts.

Accordingly, other ongoing price triggered interventions, need to be strengthened to enable decentralised and prompt decision making, so as to make their execution effective. Delayed action to a deteriorating market situation benefits intermediaries instead of farmers, by allowing initial distress buyers to sell when the intervention finally props up the market price.

To maximise the market support and to make the MSP mechanism more accommodating, the procurement of surpluses by private participants is recommended. Such purchase by private parties, at MSP, can be incentivised by exempting the procuring party from stock controls and allowing them to undertake onwards trade of choice. This will not only augment the market intervention when prices fall below MSP, but will also provide scope to develop secondary trade channels in the long run.

Key Extracts

- The procurement mechanism functions as an assured market for farmers, and plays a role to strategically guide the cropping patterns and incentivises production.
- There is need to broad base the procurement intervention system, to other crops than wheat and paddy, and to other States than it currently benefits.
- A new Market Assurance Scheme is proposed, that empowers the States to take immediate and relevant action to buttress a falling market situation.
- Private participation in the MSP linked procurement process is proposed and can be incentivised by exempting participants from prevailing stock limits and trade limits.

Chapter 7

Warehousing

For a bulk of agricultural commodities, safe warehousing is an important tool to counter the time-spread between demand and supply. More so, warehousing as a safe custodian of produce can allow farmers to avail of immediate exchange or credit to meet their cash flow requirements.

7.1. Background

An efficient marketing system alone is not sufficient and cannot guarantee desired benefits to farmers. To make an efficient system effective, in terms of utilisation, particularly for small and marginal farmers, the sufficiency condition is met by providing a mechanism that will help them to transact at choice, when they want to. Warehousing provides this opportunity and is an important tool which improves time utility and enables the farmers to avoid an immediate sale in the surplus environment that occurs at each harvest period for certain commodities. The post-harvest period results in a supply glut, in advance of demand and this manifests in a fall in commodity price. Warehousing, therefore, allows farmers to balance their supply to markets and in the interim, enables them to avail pledge finance to meet their immediate financial requirements. Warehousing availability, of suitable type and quality, makes it an important component of the agricultural marketing system.

After independence, the All India Rural Credit Survey Committee was appointed by the RBI in 1951, which submitted its report in 1954 and recommended the creation of scientific storage facilities for the farmers near their door step, not only to avoid storage losses of agricultural produce, but also to facilitate institutional credit to the farmers.

In the light of the these recommendations, a legislation on warehousing, namely, 'Agricultural Produce (Development & Warehousing) Corporations Act, 1956' was enacted which provided three tier warehousing system in the country, involving a Central Warehousing Corporation, State Warehousing Corporations and Cooperatives. In 1962, the Government of India decided to break up the Warehousing Act, 1956 into two separate Acts, the 'National Cooperative Development Corporation Act, 1962' and the 'Warehousing Corporations Act, 1962', which gave genesis to the present set up Central and State warehousing corporations in the country.

Though substantive development in warehousing took place subsequently, there was not much improvement in the status of farmers. An Expert Committee appointed by the Ministry of Agriculture, Govt. of India on 19th December, 2000 looked into the situation and recommended introduction of a negotiable warehouse receipt system in the country. The negotiable warehouse receipts were expected to make it more attractive for banks to lend to the agricultural sector, reduce transaction cost and improve price-risk management. The need for a reliable regulatory body to create a harmonised and transparent environment for use warehouse receipts, to instil confidence in financial institutions was also felt. An Inter-ministerial Task Force on Agriculture Marketing of the Government of India, suggested for establishment of a Regulatory Authority for Warehousing in its report submitted in May, 2002.

This recommendation was further supplemented by the working group of RBI on Warehouse Receipts and Commodity Futures in 2005, which recommended the introduction of negotiability in warehouse receipt system, in line with similar instruments in operation in other countries. These developments led to the enactment of the **'**Warehousing (Development and Regulation) Act, 2007' and the establishment of the 'Warehousing Development and Regulatory Authority' (WDRA) with effect from 26-Oct-2010, and the negotiable warehouse receipt system was introduced in the country.

Today, there are three main agencies in the public sector engaged in building large scale storage/warehousing capacity viz., Food Corporation of India (FCI), Central warehousing Corporation (CWC) and State Warehousing Corporation (SWCs). The capacity available with FCI is used mainly for storage of foodgrains for the Central Pool Stock. FCI owns storage capacity and also hires storage capacity from other sources like CWC, SWCs and private owners. The main functions of the CWC and SWC are to acquire and build warehouses at suitable places and to operate them for storage of agricultural production, fertilizers, and certain other items including industrial goods.

The government also supports the private sector and Cooperatives in creating warehousing capacity. The Directorate of Marketing and Inspection (DMI) implements the Agricultural Marketing Infrastructure sub scheme (erstwhile rural godown scheme) of the Integrated Scheme for Agricultural marketing (ISAM). The government supports the creation of warehousing, including modern silos through a mechanism of financial incentives and assured lease rental agreements by FCI. These are enumerated in Volume-II of the DFI report.

7.1.1. Current warehousing capacity

Total storage capacity available within the country with different organizations is summarised in the following table:

Table 7.1 Total Warehousing capacity available

SN	Name of the Organization /Sector	Storage in million tonnes
1	Food Corporation of India (FCI)	35.92
2	Central Warehousing Corporation (CWC)	11.72
3	State Warehousing Corporations (SWCs) and State Agencies	45.28
5	Cooperative Sector	15.07
6	Private Sector (ISAM – rural godown scheme)	57.75
	Total	**165.74**

Source: WDRA Annual Report 2015-16 and DMI March, 2017

Since there is no centralised database on warehousing, the storage capacity depicted from different sources is often debated. The capacity ascertained could have a level of duplication and on the other hand, some warehousing capacity created without financial support from government agencies may be unaccounted and additional. A comprehensive warehousing status survey is indicated. The following table lists the storage capacity that has been created

under the Agricultural Marketing Infrastructure sub-scheme (erstwhile Rural Godown Scheme) of the Integrated Scheme for Agricultural Marketing (ISAM) of the Ministry of Agriculture & Farmers Welfare.

Table 7.2 Warehousing created under ISAM scheme

SN	State	Total (Sanctioned)		Storage capacity created in tonnes
		No. of projects	Capacity in tonnes	
1	Andhra Pradesh	1,296	51,56,248	51,02,311
2	Arunachal Pradesh	1	945	945
3	Assam	266	7,39,357	7,35,637
4	Bihar	990	4,87,187	4,52,957
5	Chhattisgarh	642	22,27,239	19,15,488
6	Goa	1	299	299
7	Gujarat	11,326	42,89,737	39,69,118
8	Haryana	2,133	57,18,591	72,16,450
9	Himachal Pradesh	78	24,798	24,797
10	Jammu & Kashmir	14	83,027	74,572
11	Jharkhand	24	1,19,316	1,19,316
12	Karnataka	4,459	48,59,174	35,43,207
13	Kerala	205	89,907	82,328
14	Madhya Pradesh	3,758	1,02,50,369	95,52,993
15	Maharashtra	3,469	63,28,513	59,76,150
16	Meghalaya	16	21,012	20,375
17	Mizoram	1	302	302
18	Nagaland	1	814	813
19	Odisha	419	7,81,575	7,70,575
20	Punjab	1,742	67,23,746	61,78,844
21	Rajasthan	1,424	25,72,908	17,36,551
22	Tamilnadu	1,105	13,32,345	10,45,469
23	Uttar Pradesh	1,108	51,93,210	27,66,733
24	Uttarakhand	278	7,52,793	7,34,192
25	West Bengal	2,548	15,70,777	15,59,742
26	Tripura	4	25,756	25,756
27	Telangana	690	41,44,820	41,44,820
28	UTs	-	-	-
	Total	**37,998**	**6,34,94,764**	**5,77,50,740**

Source: DMI, as on 30.04.2017

Over the years of post-independence period, the country witnessed significant growth in warehousing capacity, the emergence of private sector in creation of warehousing infrastructure in the country and various reforms were initiated by the government for achieving the objectives. Some of this capacity may have been leased to public sector agencies while some capacity could have moved out of agricultural warehousing.

Warehouses in India were broadly classified based on the sector to which they pertain i.e. Public Sector Warehouses (CWC, SWCs, State Civil Supply Corporation), Private Sector Warehouses (Warehouse Service Providers, Collateral Management Companies, Standalone individual Warehouses), Cooperatives (PACS, LAMPS, Cooperative, Federations etc.). Lately, the concepts of silos, cold chains, container freight stations (CFS) and inland container depots (ICD) have been gaining importance.

Public sector warehousing has been developed with the prime objective of expansion of institutional credit to farmers through the instrument of warehouse receipt, adding to the nation's wealth by reducing wastages and losses in storage, development of storage and distribution of agricultural commodities in the country for orderly marketing and price stabilization of agricultural commodities. Better price discovery through the warehousing has been expected to facilitate commodity trading in the country.

Public warehouses are the most common type of warehouses which may provide any or all of the following services viz. grading/standardization, issuance of NWR for pledge financing, scientific preservation and quality control, inventory management, safety and security of goods kept therein, insurance of stored goods, handling and transportation, door to door delivery, and C&F documentation.

The growing number of agricultural warehouses in the country has been helpful in supplementing the existing agricultural marketing infrastructure and to maintain stocks for public distribution and strategic buffer norms. However, the farmers, particularly the small and marginal farmers, have not necessarily been able to benefit from these developments due to deficiencies in the effectiveness of these initiatives.

Studies have indicated that small farm holdings contribute about 54 per cent of marketable surplus. These farmers, for want of with-holding ability, are compelled to undertake a sale immediately after harvest, such sales accounting for about 50 per cent of the marketable surplus. Their inability to hold on to harvested stocks is largely due to financial compulsions. Another factor assessed is the lack of direct access by farmers to warehouses due to low level of initial aggregation of produce at the village level, low number of accredited warehouses for issuance of NWR and low level of post-warehousing market linkages for farmers, having little capacity to divert attention for transacting sales for small lots at a later date.

Nevertheless, warehousing is an important component of the hub and spoke model and is a large aggregation point. While the initial aggregation at primary rural agricultural markets (PRAMs) or at pack-houses is done to create a viable load to transport to markets, the warehouses are the next stage in consolidating the produce. Such consolidation can enable larger capacity transport linkages, though rail or ship, to bigger markets. On the other hand, warehouses also function as a distribution hub to feed a close by market.

7.1.2. Brief assessment of warehousing capacity requirements

A proper assessment of warehousing capacity requirement requires relevant information on current and projected cropping patterns of the storable produce, seasonality in production and on the consumption demand of the area. Further, with the opening up of the country as a unified agricultural market, the warehousing network can be expected to shift towards locations and sizes to suit bulk handling logistics linkages. The storage requirement has to be assessed while also factoring the holding life of the agricultural produce, market access including export-import policy, consumption trends, etc. Demand linked information is not readily available across various consumption points and for that purpose, the Marketed Surplus is used to assess capacity needs.

Marketed surplus is the "gross quantity of produce actually sold by the farmers" and therefore may be inferred to have a link with demand and distinct from the marketable surplus in hands of farmers. The Marketed Surplus Ratio (MSR) is worked out in proportion to the production (average over last three years) and the quantity marketed. Therefore,

MSR = Quantity of produce actually sold by farmers ÷ Quantity of production

Table 7.3 Marketed Surplus estimated for major crops for storage requirement

SN	Description	Marketed Surplus
1	Cereal production (2015-16)	238.81
	Marketed surplus of cereals in 2014-15 (MSR 74.36%)	177.57
2	Pulses production (2015-16)	17.62
	Marketed surplus of pulses in 2015-16 (MSR 89.94%)	15.84
3	Foodgrains total marketed surplus (2015-16)	193.41
4	Oilseeds production (2015-16)	28.52
	Marketed surplus of oilseeds in 2015-16 (MSR 82.10%)	23.41
5	Sugarcane production (2015-16)	355.54
	Sugar produced (6.34% of sugarcane milled)	22.54

Source: *The source of MSR for Cereals (Wheat, Maize, Coarse Cereals) have been estimated on the average basis is Agri-Statistics at a Glance 2016. Agri-Statistics Division, Directorate of Economics and Statistics*

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The table reveals, that only on the basis of MSR, the storage requirement for foodgrains, oilseeds and sugarcane would be 193.41, 23.41 and 22.54 million tons respectively (about 240 million tons).

Currently, the marketed surplus data is available at the aggregate level and it does not factor in the aspects that the product movement from one demand centre to another, or from one market to other market centres. It would be more appropriate, for balancing supply and demand, if the surplus is assessed at each market level. This will help to direct the flow of produce and reduce the price volatility and localised price triggers from certain locations/markets.

Table 7.4 MSR of various crop types

SN	Group of Crops	2010-11	2011-12	2012-13	2013-14	2014-15
Cereals						
1	Rice	80.65	77.20	81.51	82.00	84.35
2	Wheat	73.20	70.00	77.49	73.11	73.78
3	Maize	86.00	83.32	84.32	86.98	88.06
4	Jowar	62.03	53.46	64.14	65.25	66.64
5	Bajra	67.38	67.48	76.77	71.11	68.42
6	Barley	73.81	59.78	67.39	80.63	77.67
7	Ragi	25.73	53.25	29.53	44.11	47.60
Pulses						
8	Arhar	73.82	81.45	84.33	86.99	88.21
9	Gram	86.68	85.25	83.67	89.58	91.10
10	Urad	63.61	70.04	77.76	80.71	85.56
11	Moong	81.54	87.32	85.55	92.22	90.65
12	Lentil	77.91	88.14	88.75	90.23	94.38
Oilseeds						
13	Groundnut	93.36	90.78	93.54	95.20	91.63
14	Rapeseed & Mustard	82.14	82.08	90.41	94.49	90.94
15	Soyabean	95.69	94.41	95.32	95.23	71.00
16	Sunflower	99.58	65.62	99.18	65.42	89.14
17	Sesamum	83.18	92.79	89.00	92.91	93.80
18	Safflower	55.12	-	-	-	100.00
19	Nigerseed	83.66	94.67	97.67	-	38.25
Other Commercial Crops						
20	Sugarcane	78.90	78.02	77.84	21.62	18.94
21	Cotton	99.79	98.36	99.41	97.32	98.79
22	Jute	99.43	83.50	100.00	100.00	98.59
Vegetables						
23	Onion	97.25	75.36	99.23	99.29	91.29
24	Potato	81.04	77.40	86.17	61.35	71.51

Across crops, the harvests are not singular events and are spread over specific periods in time while consumption is continuous throughout the year. The holding period of the crop type also needs to be evaluated and need not exceed across the subsequent harvest season. Since the marketed surplus is generated over seasons, the estimations made for storage requirement need to factor in the seasonality of production and post-storage distribution to be realistic. The scheduled liquidation of stocks through distribution channels will generally free up storage space for other crops or the same crop, before the next harvest.

A general analysis is that the bulk of marketed surplus of foodgrains is distributed either in kharif or rabi season. In case of oilseeds, the major commodities are groundnut, rapeseed and mustard and soybean (nearly 80 per cent of total oilseed production). The harvesting month of

groundnut is November. Mustard is a major rabi crop and harvested during February-March. The harvesting month of soybean is October-November, i.e. coinciding with the harvesting month of groundnut, together contributing about 55 per cent of the production. The produce normally stays for the 4 to 6 months and this storage capacity would be capable to stock the rest of the oil seeds production. For oil seeds the storage requirement can be assessed to be 55 per cent of the total marketed surplus.

Similarly, the sugar harvesting period starts in November and closes in April, at most. This is also the sugar mills operating time. It means the production distributes over the period from November to April or 5 months. Considering that the sugar at the most stays for 3 months, then storage requirement is about 60 per cent of the manufactured sugar. The marketed surplus of food grains is across kharif and rabi and stocks are distributed all throughout the year. About 50 per cent of the foodgrain marketed surplus, can be considered as the needed storage capacity.

Therefore, on broad estimates that storage would be properly managed to avoid stock-overruns across harvest periods, and that inventory is liquidated into markets at proper times, the requirement for warehousing can be assessed to be only about 125 million tonnes.

Table 7.5 Marketed surplus, distribution, warehousing assessment

Commodity	Marketed surplus	Ratio of surplus for warehousing	Storage required (million tonnes)
Foodgrains	193.41	50%	96.7
Oil seeds	23.41	55%	12.9
Sugar milled	22.54	60%	13.5
Total			123.1

Source: DMI assessments

As per the estimates given in Table 7.1, the total available storage capacity is 165.74 million tonnes and about 42 million tonnes (165.74 – 23.74) of storage capacity could be in excess. This also points to reports of low capacity utilisation of warehousing capacity in the country.

As per the available data on capacity utilization of storage available in public sector, under FCI, CWC and SWC, including both owned and hired under the South, East, North East West and North regions is 58, 60, 63, 75 and 90 per cent respectively with average of about 86 per cent. This clearly substantiates the fact that the north zone has better utilisation compared to States covered under south zone. The higher capacity utilisation in northern region is also attributed to the use by the central agencies to store stocks procured by them in that region. Inputs from the private sector also indicate that idle warehousing capacity exists in the country.

There are some fundamental factors responsible for low capacity use of warehouses by the farmers. The majority of farmers are marginal and small and may not consider it worthwhile to store the produce in a warehouse, or may be finding other alternatives easier to manage.

Further, lack of knowledge about the mechanism of negotiable warehousing receipts and associated pledge loans for the farmers, is a key reason for the very low utilisation of warehouses by farmers.

There is also a distribution asymmetry in the warehouses and these may not have always been constructed to suit the agricultural patterns or the shift in cropping patterns that can be expected in the future. Capacity created may not be suited for proper scientific storage which is necessary for the farmers to entrust their yield into the care of a third party. States are advised to develop a District level storage plan to evaluate their existing capacity, type of capacity and carry out a need assessment for upgrading the godowns and warehouses, or to create new capacity.

7.1.3. District level planning

The agricultural produce is categorised into various groups viz. cereals, pulses, oilseeds, tea, coffee, sugarcane, rubber, fruits, vegetables, cotton, milk and other produce under livestock sector, etc. These produce types are also subject to differing holding life, short term or long term. Within these categories, many can be stored in dry warehouses, while others require specialised post-harvest pre-conditioning before entering refrigerated warehouses. See Volume-III of this report for these category-wise requirements. Prior storage, all produce requires sorting or assaying by quality for full advantage in further market connectivity. These multiple variables need to be evaluated at the decentralised level, and this is recommended as part of district level planning.

The planning for storage and any associated infrastructure, by every state needs to be based on the unique agricultural practices, local to each district. Trying to develop all districts in identical manner can prove to be counter-productive. Any of such planning will depend on the production and factor in the seasonality and consumption demand of the area and the connectivity options to the larger national market.

To assess a district plan, the MSR for each produce will give the handling capacity required during harvest season. If a produce has a holding life that is shorter than the harvest period, assess capacity needed for the reduced time period. The same capacity will be freed at end of each inventory cycle. For crops of similar nature, but with a segregated harvest season, the capacity vacated by the previous crop can be brought into use. This inventory cycling and cross-storage planning avoid capacity and cost overruns. Adding up all capacity of marketable surplus, without planning for harvest period differentiation and distribution patterns will not be efficient planning method.

7.2. Warehouse Receipts System (WRS)

The warehouse receipt (WR) is a document in hard or soft form issued by the warehouse operator to the goods owner and certifies the title to the deposited commodities, its type, quantity and quality (grades) and facilitates storage, access to credit and futures trade.The basic principle of warehouse receipt (WR) is to validate the quantity and type of goods stored in a warehouse. The quantity stored can be used as collateral to avail a loan. For such a financing

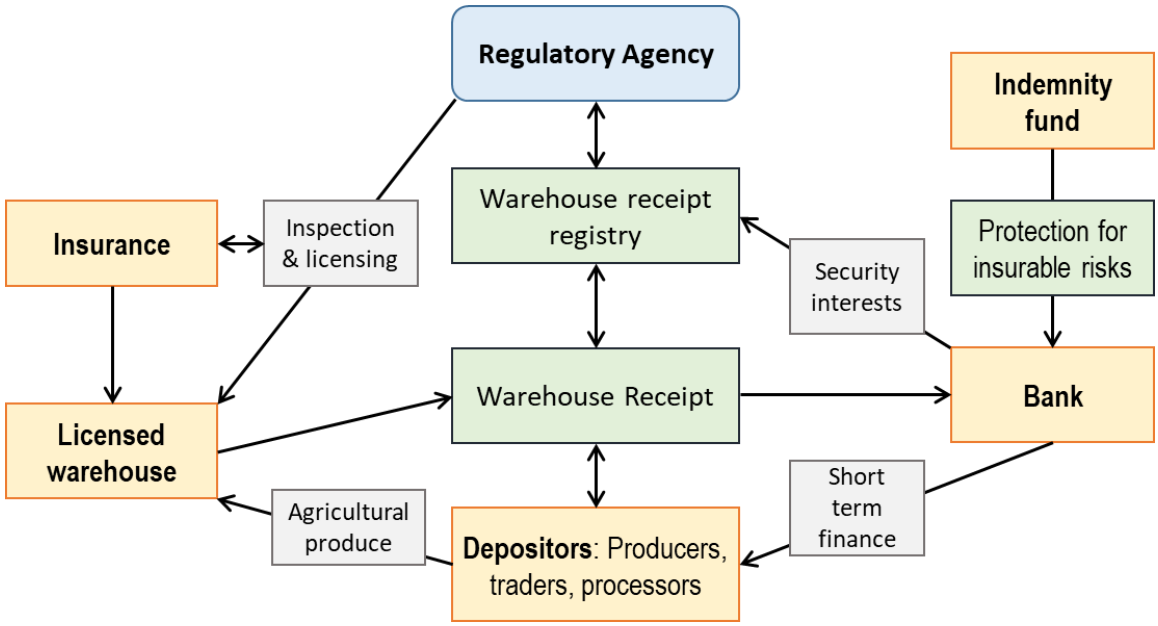
system to function, the warehouse receipt needs to be trustworthy and the goods fungible.

A well organised warehouse system can be helpful in improving the efficiency of agricultural marketing through better price discovery by allowing the produce to be traded at a time of choice. With the help of an online marketing platform, the agricultural produce can also be traded at a location or with a buyer of choice. The effectiveness is however linked to the delivery of services by the warehouses, in terms of their assaying facility, the operational excellence in storing the goods and the system integration for online auction and sale of the warehoused goods.

7.2.1. Elements of a warehouse receipt system

A warehouse receipt system (WRS) enables farmers to deposit storable goods in exchange for a warehouse receipt (WR). In order to ensure that the WRS is capable of driving the desired economic advantages, an enabling legal and regulatory framework with the backup of a regulatory and supervisory agency is put in place. Warehouses would need to be licensed to safe-guard the farmers as goods owners and this is supported by insurance and financial performance guarantees. There is also need for close involvement of the banking system as stakeholders who would have to honour the warehouse receipts.

Figure 7.1 Components of a Warehouse Receipt System



A well-developed negotiable warehouse receipt finance system benefits the farmers preventing distress sale by knocking the doors of informal lending sector (that charges hefty interest rates), banks/financial institutions, insurance companies, commodity exchanges and ultimately to the rural economy.

Warehouse receipts are commonly issued when goods are stored in care of a warehouse operator. However, the loan provided against such commonly issued WR, is at normal

commercial bank rates, as applicable. When the WR is in the form of a negotiable warehouse receipt (NWR), the owner of the goods can avail pledge loan at rates with interest subvention. The NWR is a fungible instrument and can itself be traded or sold to transfer ownership of goods, whilst under care of the warehouse operator. To issue an NWR, the warehouse has to be registered with the Warehousing Development and Regulatory Authority (WDRA).

The WDRA implements the Negotiable Warehouse Receipt (NWR) System in the country. A warehouse can issue NWR once it is accredited and registered with the WDRA. As the Negotiable Warehouse Receipt (NWR) is issued in token of acceptance of goods, it therefore, carries a guarantee that the quality and quantity as described in it will be delivered to the holder of the NWR after the storage period which is also mentioned in the terms and conditions of the NWR. The NWR also provides an assurance that the goods will remain safe upto the end of the initial storage period. Obviously this can be possible only if the quality and quantity of the goods can be preserved during storage adopting scientific techniques of preservation in warehouse structures meeting the prescribed standards and having a strict supervision and security arrangements.

Registration of warehouses under the Act is optional/voluntary. Only those warehouses which intend to issue NWRs have to get registered with WDRA. Further, the registered warehouses can also issue non-negotiable warehouse receipts. As on 30th June 2017, the Authority has registered 1436 warehouses in the country.

Table 7.6 Number of warehouses registered with WDRA

SN	Agency	Warehouses registered with WDRA	Capacity (million tons)
1	CWC	185	0.68
2	SWCs	185	0.72
3	PACs	260	0.06
4	Private (including cold stores)	806	5.14
	Total	**1436**	**6.60**

The WDRA has so far notified 123 agricultural commodities including cereals, pulses, oil seeds, spices, dry fruits, tea, coffee and rubber etc. as per the standards prescribed by the Agmark, or other approved grading agencies for issuing NWRs. Besides, 26 horticultural commodities have also been notified for issuance of NWRs by cold storages.

In order to popularize the NWR system and to encourage warehouses to get registered with the WDRA, the Authority has taken the following steps:

a) Notification of New Registration Rules

The Registration Rules 2010 have been superseded by the Warehousing (Development and Regulation) Registration of Warehouses Rules, 2017. Salient features of the new Registration rules are as under:

- No accreditation required before registration. Application for registration is directly received by WDRA which get the warehouse inspected before deciding registration
- Entire capacity of a warehouse has to be registered
- One application may have more than warehouses of same applicant
- A more robust system of inspection of warehouses has been put in place.
- Registration fee ranges from Rs 20,000 to Rs 30,000 and is based on capacity of the warehouse. **For PACS and FPO the Registration fee is Rs 5,000 per application only. Similarly the total Security Deposit in case the warehouseman is a FPO or a Cooperative is kept at only Rs 50,000 (fixed) per warehouse to be furnished in the form of a bank guarantee.**
- Period of registration has been enhanced from 3 to 5 years
- Clearly defined norm specified for infrastructure, SoPs, networth and security deposit
- Security deposit norms are more realistic and dynamic in nature depending on the value of stock covered in NWRs issued by the warehouseman
- A well-defined process of surrender, suspension and cancellation of registration has been prescribed.
- Performance requirements for a warehouse during registration is now well defined.
- Authority is enabled to take over the stock of defaulting warehouses and manage/ liquidate it to prevent potential loss to NWR holders
- A well-defined 'Know Your Depositor' (KYD) process
- Migration to e-NWR and linkage with a repository after a specified date is made mandatory. Rule 27 (1) of the new Registration Rules, 2017 require that with effect from such date as may be specified by the Authority, no warehouseman shall issue any negotiable warehouse receipts in physical form, and shall register with one or more repositories registered with the Authority for issuing negotiable warehouse receipts in electronic form.

b) Introduction of Electronic Warehouse Receipt System

The WDRA has taken steps to launch electronic Warehouse Receipts. The Electronic Warehouse Receipts (eNWRs) provide for **faster movement of information** and **automatic creation of audit trail**. eNWRs can **break barriers and promote national market** in agricultural goods to benefit farmers. Rule 27 (1) of the Warehousing (Development and Regulation) Registration of Warehouses Rules, 2017 requires that with effect from such date as may be specified by the Authority, no warehouseman shall issue any negotiable warehouse receipts in physical form, and shall register with one or more repositories registered with the Authority for issuing negotiable warehouse receipts in electronic form.

The eNWRs come with distinct advantages over the paper based receipts as under,

- help farmers / depositors to have access to a large number of buyers nationwide with better bargaining powers;

- enable multiple transfers without physical movement of goods and alternate channels of marketing to farmers and reduce the cost of intermediation for consumers;
- enable consumers (industries, processors, wholesalers, retailers etc.) to procure graded produce at competitive prices at locations of their choice;
- promote an efficient clearing, settlement and delivery system with transparency in trading of agricultural produce;
- eNWRs can be split with obligation to transfer only a part of the commodity;
- eNWRs can be traded through off-market or exchanges;
- eNWRs can be issued by Repositories and traded in commodity Exchanges. The single source of information for the eNWR will be the repository;
- eNWR has a time validity that is co-terminus with the validity of the commodity or withdrawal of the commodity fully from the warehouse, after which it expires; and
- eNWR can be auctioned under certain conditions such as loan not repaid, on expiry and delivery not taken and on damage or spoilage of the commodity in the warehouse.

c) Notification of e-NWR Regulations

The WDRA, with the prior approval of the Government, has notified the Warehousing Development and Regulatory Authority (electronic Negotiable Warehouse Receipts) Regulations, 2017 on June 29, 2017 which provides the processes for creation and further management of the eNWRs. It is also mandated that eNWR shall include all the information prescribed under Section 11(1) of the Warehousing Development and Regulation Act, 2007

d) Establishment of Repositories

The WDRA has initiated the process to establish repositories for the creation and management of electronic NWRs.

e) Enabling Environment to Implement eNWR System in the Country

In order to create an enabling environment for smooth launch of eNWRs, various measures have been taken up. These include creating online web portal, a monitoring and surveillance system and organising awareness & training programmes.

- Public content providing general information for stakeholders.
- Applications for warehouse registration, logging of warehouse inspections, quality control reporting by warehouses & regulatory reporting by repositories, logging complaints & disputes, etc.
- Online learning & certification content for various stakeholders.
- Provides functionality for analysis of regulatory reporting data to derive insights related to compliance by regulated entities.
- Training programmes for warehousemen of registered warehouses.

Following are the benefits of using negotiable warehousing receipts:

(i) Enables farmers, as owner of the stored collateral, to access loan from financial institutions.
(ii) Allows banks to improve the quality of their lending services and enhance their interest in financing the NWRs.
(iii) Minimises risks and transaction costs to intermediaries and farmers in undertaking commercial operations.
(iv) Increases the liquidity in the rural areas.
(v) Encourages scientific warehousing of agricultural commodities.
(vi) Lowers the cost of financing by the banks.
(vii) Improves buffering of the supply chain.
(viii) Assigns greater value for graded and quality produce.

In order to cover the risk factor, the goods are insured against fire, flood, cyclone, strike/riots, theft/burglary, misappropriation, fidelity guarantee, etc. if there is any danger of the same. Barring the fluctuations in price, practically all risks are covered by the warehouses. Warehousing thus ensures safe return of goods or value thereof to the depositor, thus providing a value addition to the quality of goods which makes them acceptable to the financing institutions as a credible item of exchange for pledge financing as they are sure of realising their money by disposal of underlying goods in the event of any default by the depositor.

The finance against NWR is related not only to warehousing and banking but also to the agricultural market. The agencies having integration with the market are found better equipped for disbursement of pledge finance like the collateral management service providers, APMCs and warehousing corporation. The collateral management service agencies, seem to give preference to traders over farmers, while marketing facilitating public agencies like APMC seem to focus more on small holder farmers. This is more a reflection of the business models involved. At present, majority of the APMC markets are not integrated with warehousing or cold storage facilities. Foodgrain and oilseed crops have been found to be popular from storage point of view and maximum benefits on storage have also been observed in these crops.

7.3. Strengthening Negotiable Warehouse Receipt System (NWRS)

Crop loan scheme with interest subvention extended to post-harvest on NWRs

The existing scheme provides pledge financing with emphasis on small and marginal farmer and all the farmers holding KCC against NWRs issued by all the registered warehouses including cold storages. The current limit for KCC is Rs. 3.0 lakh and automatically enhanced to 75 per cent of the price of the agricultural goods.

Publicity of the scheme

In order to help the farmers take advantage of the NWR system, sufficient publicity has to be made, in both print and electronic media, by different agencies, such as CWC, SWCs,

NABARD, Cooperative Departments of the States and Banks etc. The interest subvention scheme of pledge loan against the NWRs may be advertised by the banks, highlighting the need for scientific storage, merits of NWRs and the importance for storing the produce in the WDRA-recognized warehouses/cold storages. Different extension agencies of the agriculture and allied departments should also allocate funds for such publicity.

Bank may set internal targets for lending against negotiable warehouse receipts. This may be monitored by RBI in case of commercial banks and by NABARD in case of Cooperatives / RRBs. The progress should be reported to DFS / WDRA by RBI / NABARD with action plan / action taken report, for review.

Need for full-fledged infrastructure status to storage structures

For availing benefits of concession in Income Tax, lower rate of interest on loans etc. it is recommended that agricultural warehousing should be accorded a full-fledged infrastructure status. This would include integrated pack-houses and cold stores set up at village level.

NWR as Government security under Securities Contracts (Regulation) Act, 1956

The Department of Economic Affairs, Ministry of Finance may consider and declare the negotiable warehouse receipt as Government security under the Securities Contracts (Regulation) Act, 1956 as specified in section 2 of Public Debt Act, 1944 so that the entire regulatory framework applicable to dematerialisation and transfer of "securities by NDSL would apply to NWR".

Warehouses to be declared as Mandis

It is recommended that the Government of India may pursue the matter with all the State Governments for declaring registered warehouses to be notified as Mandis under the relevant State Marketing Act. This is provided for in the new Model 'Agricultural Producer and Livestock Market Act, 2017. The State of Karnataka has taken initiative on this issue. In Punjab, the State Government has declared some silos as Mandis. Other States may also notify warehouses registered with the WDRA as Mandis to facilitate trade.

PPP for promoting assaying of agriculture produce

As on today, there exist number of NABL accredited laboratories are there in the private sector which are undertaking the assaying activity for export purpose. These laboratories have been approved by the APEDA. These private NABL accredited laboratories may be roped in for undertaking assaying of various agricultural commodities in the e-NAM mandis on a PPP mode or exclusively in the private sector.

7.4. Pledge Loan Scheme

The pledge loan scheme was formulated by some state governments to protect farmers against sharp fall in farm prices. The mechanism of pledge finance to the farmers will enable them to avail credit, when the prices are low and to sell their produce, when the prices are favourable. The aim of pledge loan scheme is to protect the interests of the farmers against distress sale of

agricultural produce by providing short term loan against the pledge of the produce at zero/low interest rates. The idea is to provide access to both easy credit and safe and scientific storage.

Initially, pledge loan scheme was extended by the financing banks against the State and Central Warehousing Corporations' warehouse receipts to facilitate the farmers with short term credit, when the prices of agricultural commodities are low. However, since the godowns of State and Central Warehousing Corporations were limited and located at divisional or district level involving transportation charges, the facility was not available to all the farmers.

Subsequently, the Agricultural Marketing Departments/Boards of various States started implementing the pledge loan scheme, through their APMCs. However, due to limited storage infrastructure available with APMCs and their dependence on SWC/CWC godowns, the situation was not suitably changed by the involvement of the Agricultural Marketing Departments/Boards. Meanwhile, the banks extending post-harvest loans under pledge finance were facing the problems of assessment of the quality of agricultural produce stored and security of the stored produce that could be pledged even at farmers' sites.

This gave rise to the emergence of Collateral Management Service providers like National Collateral Management Services Ltd. (NCMSL), National Bulk Handling Corporation Ltd. (NBHC) etc., which are being promoted by a consortium of banks and other related organisations. These Collateral Management Service Providers assay the quality of the produce, maintain and manage the produce, issue warehousing receipts and offer collateral security of the produce stored to the banks on behalf of the farmers who store the produce. They in turn charge their margin for the services provided. The banks extend pledge finance to the farmers against these warehouse receipts issued.

There is no pledge finance scheme being implemented in the State by any agency in Bihar, Jharkhand, Himachal Pradesh, Uttar Pradesh, West Bengal, Orissa, Assam, Arunachal Pradesh, Manipur, Mizoram, Meghalaya, Nagaland, Sikkim, Tripura, and Delhi.

7.4.1. Pledge loan scheme implemented by different banks

Pledge loan facility is available from commercial banks against the produce stored. The rate of interest varies across banks. The repayment period is normally up to six months, which can be extended upto one year depending upon the quality condition of the produce with the revalidation done once in three months. Some cases are discussed below.

BANK OF INDIA provides pledge loan to the extent of 70 to 60 per cent of market value of farm produce (max. Rs.50 lakh) to its non-defaulting individual farmers (owner/ tenant farmer & share cropper), group of farmers (JLGs), engaged in production of crops suitable for storage in warehouse/ godown/ cold storage/ regulated market yards, etc. at rate of interest of 1 per cent over base rate upto Rs.3 lakh, 1.5 per cent over base rate for loans over Rs.3 lakh to Rs.10 lakh and 2 per cent over base rate for loans over Rs.10 lakh to Rs.50 lakh for other than small & marginal farmers. Small/ Marginal Farmers having KCC facility get interest subvention for

maximum period of 6 months up to a limit of Rs.3 lakh. The loan has to be liquidated within 12 months from the date of disbursement.

SYNDICATE BANK extends 75 per cent of the value of the produce as Pledge/Produce Marketing loan. No mortgage is required up to a loan amount of Rs.1.00 lakh. For loans above Rs.1.00 lakh, security as applicable to agricultural loans is required. However, loans up to Rs.10 lakh issued against bonds/warehouse receipts by cold storages/warehouses registered with WDRA, are extended certain relaxation in security norms and concessions in interest.

VIJAYA BANK provides loans up to Rs.10 lakh to farmers, repayable in 12 months against hypothecation/pledge of agricultural produce, including warehouse receipt.

INDIAN BANK provides loans utpo 70 per cent of the wholesale market price of the produce stored in CWC/SWC or authorised or approved private godowns, with a maximum of Rs.10.00 lakh, repayable within 12 months.

IDBI BANK extends financial assistance against pledge of agricultural commodities, to farmers (min. Rs. 25,000 and max. Rs. 10 lakh), traders (min. Rs. 25,000 and max. Rs. 5 crore) and processors (min. Rs. 10 lakh and max. Rs. 100 crore) for a maximum of 12 months from the date lodging commodities or shelf life of the product.

Table 7.7 Pledge finance against produce stored in State Warehouse Corporations in different states

Year	Karnataka		Andhra Pradesh		Tamil Nadu		Kerala		Madhya Pradesh	
	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No
2009-10	55341.84	18780	Nil	Nil			2021.26	130	3395.57	1628
2010-11	51944.01	18048	Nil	Nil	19100	3599	2444.40	116	2024.87	1124
2011-12	34114.54	12072	Nil	Nil	19100	3529	2251.82	234	916.76	380
2012-13	44726.41	12986	Nil	Nil	9300	1479	3956.49	190	605.79	233
2013-14	NA	NA	291.80	145	13900	1975	4949.97	188	2469.25	509

Table 7.8 Pledge finance against produce stored in Central Warehouse Corporations in different states

Year	Andhra Pradesh		Tamil Nadu		Kerala		Gujarat		Maharashtra	
	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No	Amount (Rs Lakh)	No	Amount (Rs.Lakh)	No
2009-10	46911.46	7199	Nil	Nil	3554	136	288.93	57	538	139
2010-11	9764.47	7211	Nil	Nil	10639	664	126.13	17	684	171
2011-12	2082.33	1032	3212.43	346	4295	376	36.58	07	898	199
2012-13	3648.32	2409	3089.05	543	2543	102	517.63	46	1470	336
2013-14	2143.37	1439	6264.58	795	704	1328	2019.67	62	1644	390

7.4.2. Pledge loan by State Agricultural Marketing Departments/Boards

Andhra Pradesh Agricultural Marketing Department implements pledge finance scheme viz., *Rythu Bandhu Pathakam*, since 1999. The advances are limited to 75 per cent of the value of agricultural produce pledged subject to a ceiling of Rs.1,00,000/- per farmer. Interest is not charged on the loans sanctioned under *Rythu Bandhu Pathakam* for the first 90 days. Interest at 3 per cent p.a. is charged from 91st day onwards if they lift the produce within a period of

180 days. If not, a penal interest of 12 per cent is charged on loan from 91st day onwards up to 270 days; after 270 days, the APMCs have the right to dispose of the produce and recover the loan from the sale proceeds. Wherever Agricultural Produce Market Committees do not have their own godowns or have inadequate space, pledge loan is sanctioned against the produce stored in the godowns of State/Central Warehousing Corporation. The Warehousing Corporations concerned give an undertaking to the Agricultural Market Committee that they will not allow the farmers to remove or sell the stocks without the specific and prior approval of the concerned Agricultural Market Committee.

The Karnataka Agricultural Producer Marketing (Regulation) Act provides for sanction of such short-term advances by the market committee to the producer cum seller on pledge of his produce with the market committee. This scheme is in force since 15-8-1995 in 132 regulated markets of the state. Loans up to a maximum of Rs. 2 lakhs or 60 per cent of the value of the agricultural produce, whichever is less, may be advanced to the farmers against the pledge of their commodities for a maximum of 180 days. No interest is charged for the first 90 days. Beyond 90 days, interest is charged at four per cent for amount up to Rs. 25,000; six per cent for amount between Rs. 25,000 and Rs. 50,000; eight per cent for the amount between Rs. 50,000 and Rs. 1 lakh and 10 per cent if for loans between Rs. 1 to 2 lakhs.

The Directorate of Agricultural Marketing & Agri-business in Tamil Nadu has been implementing pledge loan scheme to farmers through their regulated markets. Under the scheme, farmers can store their agricultural produce in the godowns of regulated markets for a maximum period of six months and can avail pledge loan up to a maximum of Rs. 2.00 lakhs. For the first 15 days, no interest is charged and beyond 15 days interest is charged at 5 per cent. The farmers can store their produce in the regulated market for a maximum period of 6 months.

APMCs in Rajasthan are implementing a pledge loan scheme since 1995. The pledge finance upto maximum Rs. 20,000/- per beneficiary is at interest of 6 per cent p.a. with repayment period of up to 9 months. Pledge finance up to Rs. 1.00 lakh per beneficiary is at 12.50 per cent interest p.a., for a period of 180 days. The pledge finance scheme is being implemented by Rajasthan State Warehousing Corporation. However, no pledge finance was extended for the period from 2009-10 to 2013-14. No warehouse receipts are being issued by Central Warehousing Corporation in Rajasthan for availing pledge finance from banks.

The Maharashtra State Agricultural Marketing Board is also implementing pledge finance scheme through their APMCs for the benefit of farmers. The advances range from 50 to 75 per cent of the market value of agricultural produce pledged. The rate of interest is 6 per cent for a period of 180 days. If the pledge loan is repaid within 180 days, interest subsidy at 3 per cent is extended to the farmers. Beyond six months, interest rate is 8 per cent; between 12 to 18 months, it is 12 per cent. Maximum period of pledge is 18 months.

Table 7.9 Pledge finance provided by APMCs in different states

Year	Karnataka	Andhra Pradesh	Tamil Nadu	Rajasthan	Maharashtra

	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.
2009-10	145.77	101	2254.04	5404	2196.01	3157	1.20	6	1727.48	NA
2010-11	207.95	150	1296.79	3024	20134.86	2817	Nil	Nil	1009.37	NA
2011-12	246.03	128	973.77	1564	1859.59	2246	Nil	Nil	895.44	NA
2012-13	503.38	193	1576.7	2815	2685.09	2381	Nil	Nil	2233.03	NA
2013-14	296.33	121	1578.63	2363	3936.56	2995	Nil	Nil	Nil	NA

7.4.3. Pledge finance by collateral security management agencies

The collateral security management agencies such as National Bulk Handling Corporation and National Collateral Management Services Limited in Andhra Pradesh, Haryana, Punjab, Rajasthan, Madhya Pradesh, Orissa and West Bengal are issuing warehouse receipts against which the banks are extending pledge loan. In some states like Karnataka, National Bulk Handling Corporation, Multi Commodity Analysts and Independent Inspection Agency etc. are providing scientific storage services at the door steps of farmers, which is being used as collateral security by the bankers for pledge loan.

Table 7.10 Pledge finance provided by collateral manager NBHC

Year	Haryana		Andhra Pradesh		Punjab		Rajasthan		Madhya Pradesh	
	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.	Amount (Rs Lakh)	No.
2009-10	81333	151	66448	2774	89771	191	92762	571	25944	432
2010-11	56872	97	66796	2484	79088	158	74527	524	19543	233
2011-12	91593	106	51873	2708	90830	163	83052	573	16464	198
2012-13	138843	133	31954	1244	159343	192	95255	559	21737	307
2013-14	1419	157	31074	1022	176446	217	116850	612	28704	386

Pledge finance by the National Bulk Handling Corporation in different states

7.4.4. Schemes for pledge financing against electronic warehouse receipts

Electronic Warehouse Receipts represent certain quantity of a particular grade of a commodity credited in the depositor's electronic account maintained with NCDEX SPOT/approved Trading cum Clearing Member (TCM). However, for the financing bank, NSPOT is to be the single point contact agency for communication and facilitation. Each commodity deposit of a particular grade is identified with the client's ID and lot number. When a particular commodity is deposited in an accredited warehouse of NCDEX SPOT by a depositor, corresponding credit of quantity deposited is given against a particular lot number in depositor's electronic WR account. Commodities deposited in the NCDEX SPOT accredited warehouse have a validity and re-validity period. Individual account for each e-pledge shall be opened in Demand Loan segment giving full details of account like name of borrower, nature and value of security, address of warehouse where goods have been stored, insurance particulars, date of inspection etc. Separate register is maintained to depict the total outstanding against any party at any given time. Minimum amount provided is Rs.50,000 and maximum is need based. However, maximum amount will be Rs.50.00 lakh for individual farmers including SHG/JLGs and Rs.25.00 crore for sole proprietorship concerns. Rapeseed and mustard seed, soyabean, guarseed, chana, pepper, sugar and other commodities as notified by NCDEX SPOT from time to time are considered for financing. The value of the commodity as security is determined at by taking the previous day's closing spot price on the respective exchanges, at the city/town/place where the godown is located.

7.4.5. Interest subvention scheme

Government provides interest subvention to different banks and cooperatives for short term crop loan extended to farmers at a concessional interest rate of 7 per cent per annum. An additional incentive of 3 per cent reduction in interest is provided to the farmers who repay the loan on or before the due date. Therefore, the overall interest on crop loans is available at 4 per cent per annum to farmers who make timely re-payment. The crop loan is offered to primarily address the credit requirement for the cultivation phase of activities. For further relief to farmers affected by natural calamities, an interest subvention of 2 per cent is made available to banks for the first year of restructured amount of crop loans.

While achieving high productivity and overall production in the agricultural sector has its importance, equal importance is required to prevent inopportune or distress sales. For this purpose, there is also provision for concessional post-harvest loan to small and marginal farmers against negotiable warehouse receipts (NWRs). The post-harvest loan, on the value of agricultural produce kept under pledge terms in storage, is eligible for the same interest subvention of 2 per cent (as for crop loans) for upto a period of 6 months.

This is offered only to small and marginal farmers holding Kisan Credit Card (KCC). Small and marginal farmers who have not availed crop loans through banking system, are not eligible for the concessional loan on the post-harvest loan (pledge loan). The Committee recommends that such farmers also be allowed a post-harvest loan on concessional rate against NWR.

It is felt that even though a small and marginal farmer may not have availed a crop loan from the banking system, either because there was no need or was earlier a loan defaulter, which situation could have changed. A change may also occur in the market circumstance after harvest, which may necessitate the need for a post-harvest loan at concessional rates.

7.4.6. Critical Assessment

The above data on pledge loans by banks and non-banking (APMC/Collateral managers) sector makes it evident that the reach of the facility is very insignificant. The factors responsible for low popularity of credit flow under post-harvest loan are:

i. Poor awareness level of the facility among farmers
ii. Physical availability of warehouses accessible to farmers
iii. Small lots in hands of small farmers, having minimal facility for aggregation
iv. Complicated procedure for getting the pledge loan
v. Negotiability restriction under the NWR required to obtain the pledge loan.
vi. Lack of confidence among bankers about the management at the warehouses

There is an obvious need to make farmers more aware of the pre-requisites and to extend more favourable terms for the pledge loans. As the collateral is the produce itself, suitable assaying of quality and quantity is also necessary. For this purpose, the registration of warehouse under WDRA is a preferred option.

There is no Pledge Finance Scheme being implemented in the State by any agency in Bihar, Jharkhand, Himachal Pradesh, Uttar Pradesh, West Bengal, Odisha, Assam, Arunachal Pradesh, Manipur, Mizoram, Meghalaya, Nagaland, Sikkim, Tripura, and Delhi.

In the current agricultural marketing system, most of the market functionaries can access financing against negotiable warehouse receipt (NWR), issued by WDRA registered warehouses. The warehouse receipt system (WRS) has the potential to improve the access to institutional credit of farming community. Moreover, requisite no. of agencies have not been identified for disbursement of pledge finance. The APMCs, State Agriculture Marketing Board can take a bigger role in addition to the banks and collateral agencies.

7.5. Strengthening Warehousing and the Pledge Loan Scheme

The pledge loan mechanism plays an important role in mitigating the ill effects of distress sale. However, though the program has been in existence for long, the effectiveness in helping the farming community has been far from satisfactory. In this context certain strategies can be prescribed as follows:

i. The number of farmers availing pledge loan is insignificant. Efforts need to be made to enhance awareness among the farmers about the concept of pledge loan.

ii. Since scientific storage of the produce is a pre-condition for the advance of the loan by regulated markets / banks, creation of scientific storage facility in rural areas, where farmers can store the produce and get warehouse receipts is essential.

iii. There are instances of bank tie-up with private sector collateral security providers, who ensure scientific storage of the produce at farmers' door steps and provide collateral security to the bankers for the advance of loan. However, such tie-ups are seen only between the banks and collateral security agencies. Thus, it is necessary to have similar tie-ups between regulated markets and such agencies as pledge loan from market committees is more economical in terms of the rate of interest.

iv. It is a complaint of market committee officials that they do not have adequate staff to effectively implement pledge loan scheme. It is thus required, that market committees recruit staff to exclusively deal with the scheme.

v. The amount of pledge loan advanced by the regulated markets is generally less than the amount advanced by the banks. Thus, it is advisable that provisions are made by the respective state governments to enhance the quantum of pledge loan advanced by the regulated markets.

vi. The regulated markets in some states like Karnataka lack scientific storage facility. As such, they depend on storage available mainly with SWC and CWC godowns. For the promotion and development of pledge loan system, it is essential that the market committees have their well-developed scientific storage infrastructure.

vii. Small storage facilities may also be developed at village level, as proposed under the new market architecture, involving upgradation of sub-market yards and at assembly

markets (PRAMs).

viii. Develop harmonised tradable standards for use of warehousing, post-harvest pledge loans and on eNAM.

ix. A Credit Guarantee Fund for availing the pledge loan facility may be created by the Banks, Cooperative Departments of the States, KVKs and Marketing Boards/Market Committees. Banks may be mandated to pledge finance commodity loans upto Rs.2-3 lakhs provided it is against eNWR issued by a WDRA registered warehouse.

i. WDRA may conduct a baseline survey of all agricultural warehousing, available for public use and categorise by technology and utility. The information on the storage capacity in various states (with FCI, CWC, SWC, cooperative sector and private sector) is not monitored or made available under one agency. In the absence of unified monitoring agency, District Level Storage Plans cannot be developed as per requirements. It is recommended to have a Single Monitoring Agency and as repository of database of warehousing capacity in the country.

7.6. Annotation

The Committee is of opinion that the government should develop comprehensive guidelines to promote and popularise warehousing as the fulcrum of the pledge loan system and electronic trading. This alone will fulfil the condition of sufficiency and make for an efficient agricultural marketing system.

It is learnt that substantive capacity of storage infrastructure built under the ISAM has been diverted for commercial use unrelated to agriculture.

In preparing the District Storage Plan, the status of existing infrastructure may be examined. Further, emphasis should be bringing adherence to the standards of WDRA, so that the storage godowns can be certified as warehouses. This necessitates, restructuring of the existing godowns to meet the desired WDRA standards and ensuring, that new constructions are in strict conformity with the standard.

Key Extracts

- Warehousing is the key to providing post-harvest pledge loans to farmers and for participating in electronic trading
- Modernisation of warehousing capacity in compliance with WDRA standards is felt necessary and new requirement is to be suitably assessed in District Storage Plan
- The seasonal nature of storage demand and commodity-specific requirements need to be delineated when preparing District Storage Plans.

Chapter 8

Value System Partnership Platform

Market linkage means correlating of various commercial activities with the aspects that define the market value of the output. The value is made assessable through a 'farm-to-fork' supply, which is made efficient when it is guided by the 'fork-to-farm' flow of demand and the associated value.

The farm income based approach to practicing agricultural marketing demands a 'fork-to-farm' route in preference to the commonly advocated 'farm-to-fork' option. If the purpose is to transfer optimal monetary returns on his produce, the farmer would then need to grow what can sell, and reach out to the end-use point without loss of quantity and comprise of quality. Hence, the need to transit from production led agriculture to market-led agriculture.

A value system platform that contains the organically linked value chains and the supply chain sub-systems can meet the desired objective. The platform would be one that helps to on-board multi-stakeholders from government non-government and private sectors as working partners. The primary objective would be to strengthen market linkages of farmers, alongside the development of market yards / alternate markets, cold chains and food processing units.

For enhancing income of farmers there is a need to reduce risk, encourage investment and strengthen supply chain. This gives opportunity to create partnership between farmer's group and market players, input suppliers, financial institutions and research bodies. One of the way of transformation is through integrated value chain with a bottom up approach from village level coordination to national level.

Given the importance of supporting the integration of value chains into holistic value systems, the Government of India had issued the framework for supporting Public Private Partnership for Integrated Agriculture Development (PPPIAD), operated under the Rashtriya Krishi Vikas Yojna (RKVY). PPPIAD is conceived as an alternative mode of implementation, which facilitates bringing in the technical and managerial capabilities of the private sector in combination with public funding, to achieve integrated and sustainable outcomes, as well to achieve system-wide value chain integration and attract additional private investment in agriculture. The program is implemented under the direct supervision of State Governments. The main features and objectives at the time of conception are in the annexures.

Many state level interventions on value chains, are supported in synergy with the PPPIAD program. World Economic Forum, under its global initiative 'New Vision for Agriculture' (NVA), is working with three states, Andhra Pradesh, Karnataka and Maharashtra, to catalyse partnerships with private professional agencies, for integrating value-chains so as to result in higher returns to the farmer.

In Maharashtra, beginning with 11 projects in 2012-13, the partnership grew to include 33 value chain projects with more than 60 participating companies. Within three years the programme could scale up to five lakh farmers and also brought in income improvements by

10-30 per cent. For example, in maize, farmers saved on inputs (3-5 per cent of overall cultivation costs due to direct supply of fertilizer from the private partner), saw increased yields (on average, a 35 per cent increase in yield) and received higher prices through direct sale to purchaser (minimum of 3-5 per cent higher effective sales price).

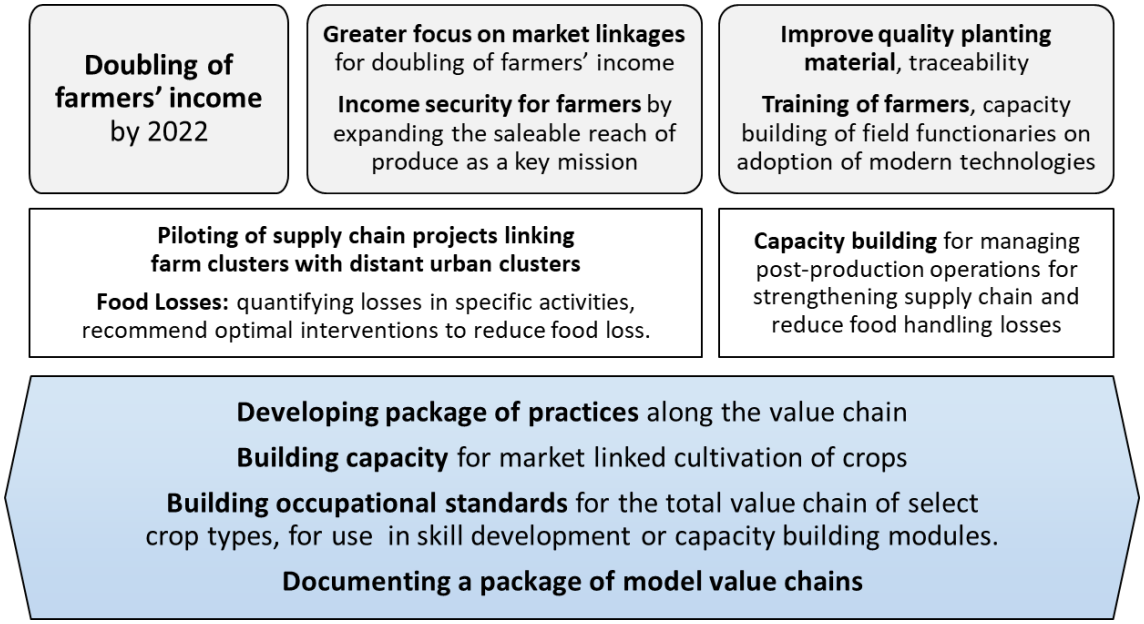
In Andhra Pradesh, the partnership platform (launched in 2016) aims to achieve double-digit inclusive agriculture growth. The state has identified 25 growth sectors – including agriculture, horticulture, animal husbandry and fishery – to support involved value-chain projects.

In Karnataka recently, the state government launched a Public-Private Partnership for Integrated Horticulture Development (PPPIHD) to improve horticultural value chains through technology interventions and marketing solutions. Seven projects are operational with additional five in the pipeline. The state is expanding the project beyond horticulture.

It is understood that other states including Telangana, West Bengal, Madhya Pradesh, Meghalaya and Tamil Nadu are evincing interest in this PPP model to strengthen collaboration and investment in the value chains.

Another recent example is the 'Green Innovation Centre' (GIC), an initiative in cooperation with governments of India and Germany. DAC&FW and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) have entered into an agreement, where the GIC will intervene for two crops in select regions in Karnataka and Maharashtra. This program integrates plans to intervene in various market linked value chain segments, starting from farm management to post-production delivery. The project indicators include enhancing of farmers' income, farm productivity and employment generation in the value chains addressed.

Figure 8.1 Synergising value chain interventions with GOI priorities

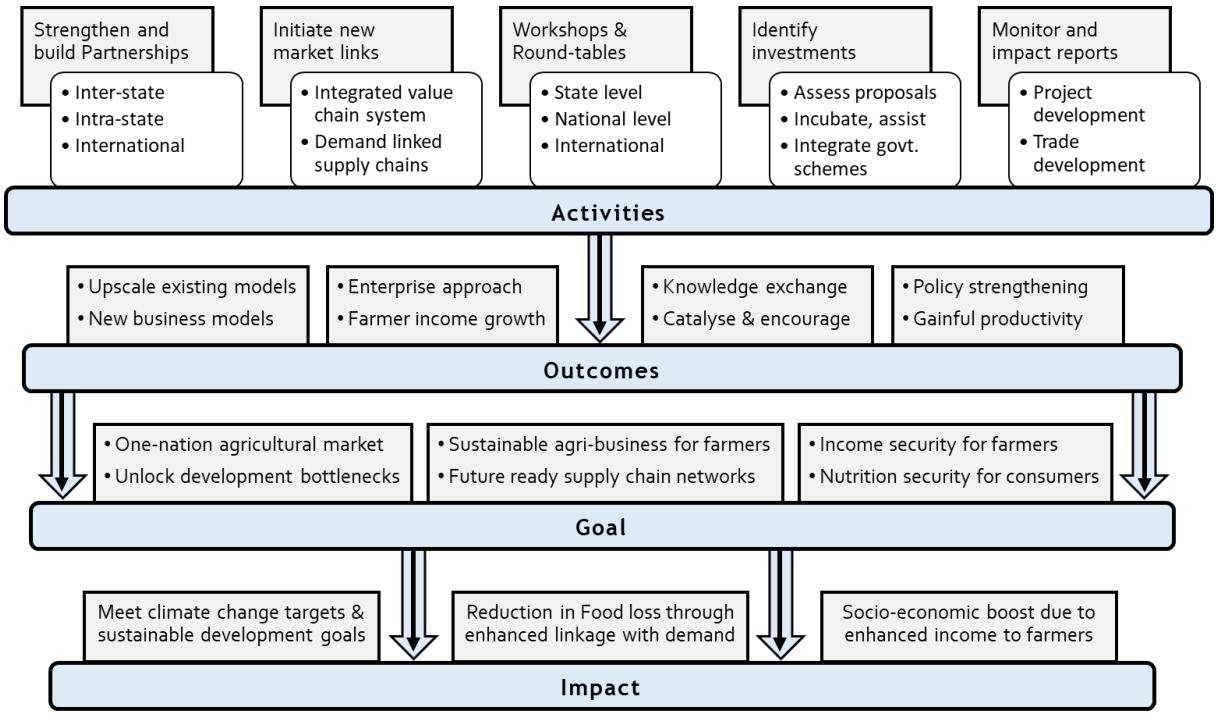


Various localised initiatives to address the inefficiencies in the value chains involved in agriculture, are in play. Interventions in the agricultural value chain system, of similar nature, are also undertaken by NGOs, foundations, international donor agencies and by commercial enterprises themselves.

A key success factor for such models has been strong leadership and co-creation, with the government setting the vision and enabling policy framework; the private sector helping to deliver on that vision through scalable and inclusive market-based activity; and key stakeholders such as farmer organisations, civil society and international organisations combining their resources and expertise. Agricultural marketing is becoming increasingly cross-geographical and needs to address the demand and supply at the unified market level. To support a transformation of the food system in India, in partnership with private sector enterprises, a national level platform will bring about concerted gains to farmers, from other recent initiatives that allow for the one-nation market to flourish.

8.1. National Value System Partnership Platform

It is recommended that at the central level, a National Value System Partnership Platform be established, to bring together the collective power of all the stakeholders in the agricultural ecosystem - the government, private companies, educational, NGOs and from research and development - to transform the sector at multiple levels.



The partnership platform will target to prioritise activities that improve farmers' income and at the same time provide food and nutritional security by enabling healthy and affordable choices across the food value chain. With the government providing and co-financing the back-end of the value chain, and the private sector and farmer contributions doing the rest, the agricultural

sector can still remain as a primary engine of rural growth and poverty reduction in India.

8.2. Objectives and Scope

The objective of the Value System Partnership Platform will be to support **transformation of food system development** in India. The desired outcome of implementation of sustainable and inclusive value chain partnerships, are:

- Support the Government's vision and priorities for **doubling farmers' income** through improved productivity and market linkages.
- Provide **food and nutritional security** while enabling healthy and affordable choices across the food value chain.
- Enhance the **environmental sustainability** of agriculture and meet the challenges of a changing climate.

The scope of such a Platform will be to support both the National and State governments to catalyse investments and collaborations on projects that have multiple value chain partners, to unlock bottlenecks in implementation and scaling of such projects, and providing the enabling policy support to strengthen the agricultural marketing environment. The proposed activities at the national and state level will include:

- Brokering of new value chain partnerships at state and national levels for integration into a system-wide value chain.
- Initiation of new produce-specific cross-sectoral projects at the national level.
- Strengthening and scaling up of existing partnerships at the state level, and their collaboration across states.
- Provide an enabling policy environment through the convergence and dovetailing of various schemes and initiatives.
- Share learnings, develop capacities and promote best practice exchanges amongst states and countries.
- Develop and roll out a results based framework to monitor the overall impact on markets / trade development and take corrective action as necessary.

The platform would function under the model of public private partnership, distanced however from day-to-day functioning of the government. The PPP mode of function has potential to bring the much needed synergy in knowledge, experience and finances for triggering greater competitiveness in agribusiness. Previously mentioned, localised models through the World Economic Forum, GIZ and others, can be provided national level scale and impetus through a national level platform. The proposed platform would take up activities that will bring about:

- Greater **adoption and scaling up** of partnership model among states ("pull" factor).
- Assist in the allocation of **adequate resources** to support the state governments.
- More timely and systematic **monitoring and sharing of learnings and best practices.**

- **Convergence and alignment in relevant policies** that will enable development of larger value chain systems.
- Market linked, prioritised **identification of opportunities** for crops across states.
- **Attract new investment partners** and create more collaboration and accountability among them.

In order to guide and mentor this partnership, a steering committee comprising government, farmer organisations, NGOs, research/academic institutions, national and international development bodies, private sector and think tanks may be constituted at the level of Central Government, to be managed by a Chairman and by a Managing Director heading a secretariat. At State Level, there should be a local coordination committee again under the control of a Chairman and a CEO heading a state level executing body.

The projects taken up under this platform would aim at strategically, opening the marketing base of select crops and other produce, so as to promote the one-nation, one-market concept. Selection of projects will be done at District and Block level depending on surplus in these regions and target large cities across the country. Some examples are, marketing of fruits from North East into South India, expanding apple movement and trade from Himalayan states into other regions, opening northern Indian market for fish and marine produce from coastal regions, etc.

8.3. Governance Structure

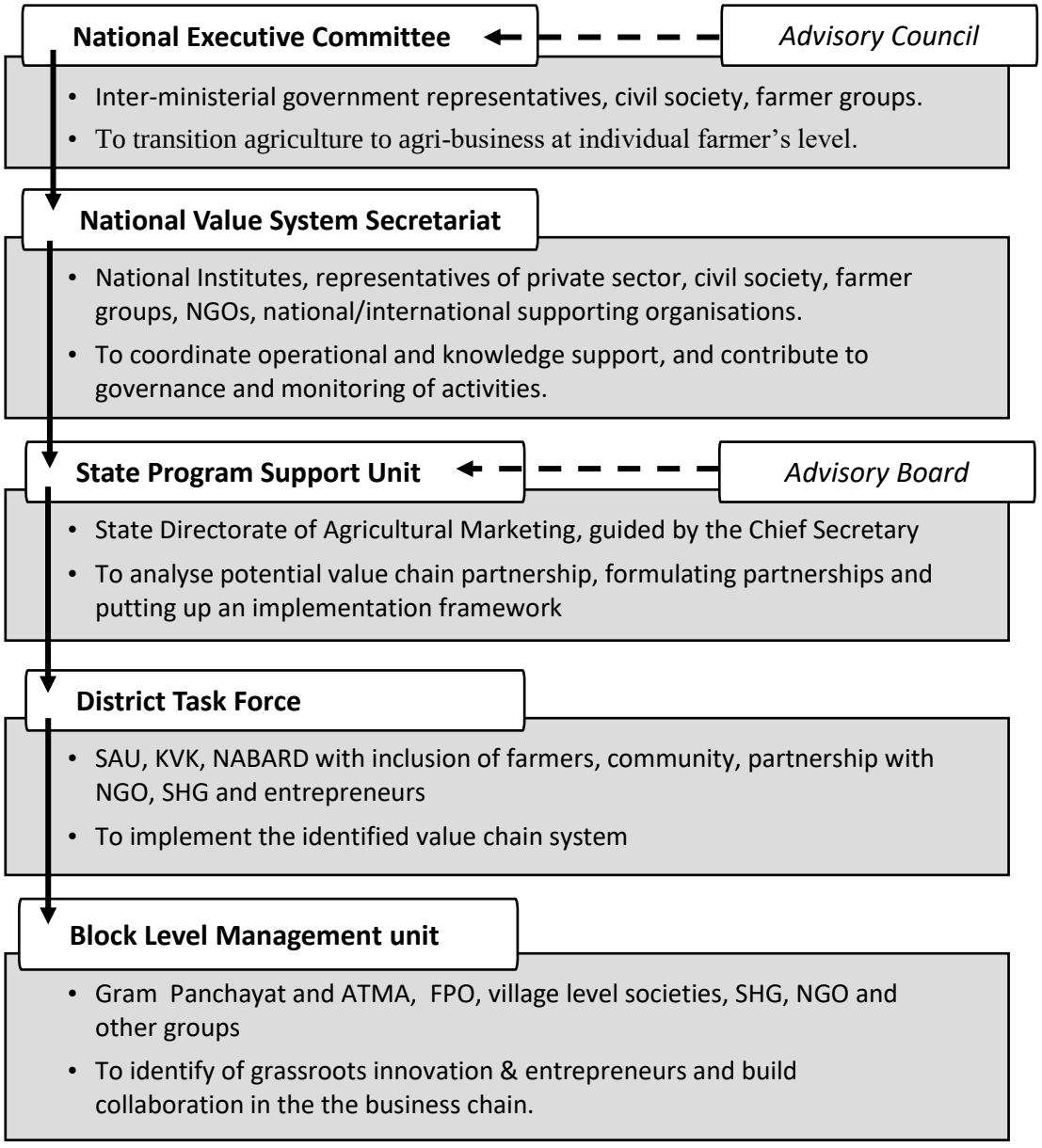
The value system partnership platform would be effected through a national level executive committee, and guided by an advisory council.

The **Advisory Council** can be a high-level body that will provide advisory support and strategic guidance on activities of the National and State Level Platforms, including input into the strategy, take decisions on matters referred to by the Steering Committee and champion and support the activities of the national platform. The Advisory Council can include:

- Government – Under Chair of Secretary, Ministry of Agriculture & Farmers Welfare, comprising Secretaries from the ministries of rural development, commerce, food processing and others, to provide direction to participating State governments.
- Private sector – Representatives from production, processing, cold-chain, retail and financial services/tech provider, industry associations like CII.
- Think tanks such as NITI Aayog and Insitutes / Centres fo Excellence from across the country.
- Multinational donor agencies and agriculture linked foundations.
- Representatives from NGOs and Farmer Producer Organisations (FPOs).

National Executive Committee: An inter-ministerial steering committee headed by an Additional Secretary of DAC&FW and senior representatives from agriculture, rural

development, commerce, food processing and others and to assist in converging of government policies. The steering committee would be guided by the multi-stakeholders Advisory Council. The Committee will provide strategic leadership, hold consultation with national and international organisations and provide guidance for new initiatives and partnerships for programmes which have potential for better returns to farmers. The Committee will also make provision for budgetary allocation for the activities and pass on to national Secretariat for execution of partnership activities.



National Value System Secretariat (NVS): The NVS Secretariat will be the main executive body and support the coordination and implementation of activities undertaken. The Secretariat would provide leadership to implement the mandate passed on by Steering committee by coordination with various States of the country. It will be engaged in knowledge management activities and undertake monitoring of value chain partnerships, provide feedback to steering committee for any mid-course correction. The secretariat will act as a repository of case studies

of integrated value chains, research and documents. The Secretariat will be housed with the facilitation of the Dept. of Agriculture & Farmers' Welfare. The executive head would be a professional with private sector experience of at least 20 years in areas such as agricultural marketing/project management/logistics/market analytics. A support staff of at least 5 individuals with appropriate professional experience from private sector in knowledge management activities would be provided.

To bring about a convergence and dovetailing of Central schemes, the NVS shall place recommendations to the Steering Committee for specific projects, so as to minimise delays and to take full advantage of extant government support mechanisms.

State level Program Support Unit (PSU): The State level coordinating executive housed under the Directorate of Agricultural Marketing to support the partnership activities in each State. A State level Advisory Board, under the chairmanship of the Chief Secretary of the State, would guide the executive. The Advisory Board would nominate a Chief Executive to the PSU. The PSU will be an independent professional agency led by the Chief Executive Officer and a team of specialists and support staff in various areas such as agricultural marketing; production technologies; capacity development; private sector development; project management etc. It will analyse potential value chain partnerships provided by district level coordinators, manage projects, broker and formalize partnerships agreements, and put in place a framework for implementation and impact study documentation. In addition to leading the project management activities and connect to National Value System Secretariat, the State coordinators will support district level coordinator for implementation. In effect the State level coordinators will implement one-nation, one-market through the partnership.

The PSU may call for the Expression of Interest (EoI) from corporates, SME and agri-startups / individuals / FPO to establish a commodity based value chain, big or small, cross regional or local with the integration of existing government interventions in the field of production, post-production, marketing and finance taken together.

The State level support to projects, through ongoing schemes, including the PPPIAD/PPPIHD program under RKVY can be coordinated through this executive body. Depending on the unique objectives and ground situation of each state, the State may opt for various interventions across produce sectors, in commercial projects. The sectors would cover animal husbandry, fisheries, horticulture, agriculture and agro-forestry.

District Task Force (DTF): The district level Task Force for project coordination can be done by experts of KVK, Agriculture Technology and Management Agency (ATMA) and NABARD (or other lead banks), to hold consultation with stakeholders, entrepreneurs, community and local governance people. The Task Force would identify and forward gaps in the value chains to the state PSU, and implement the interventions with partners. District Collector/Deputy Commissioner would be the chair of the DTF and would act as a project incubation unit. It is recommended that DTF will nominate produce specific experts as

specialist coordinators and for day-to-day interface with private corporates including farmer groups as partners. DTF can do preliminary evaluation of PPP proposals and forward to the State Level Approval Committee for further coordination by the State PSU. The DTF should also coordinate timely flow of funds from schemes to approved projects and monitor implementation timelines, deliverables and evaluation of completed projects.

Block Level Management unit (BLM): The block level coordination of activities with partnering farmers will be done by experts of KVK and ATMA and Block Development Officers. The block level coordination is required to identify potential value chains at grassroots level, identifying innovations which need to be scaled up, identifying entrepreneurs who require support. Such value chains can be earmarked to be further developed, integrated and implemented. This partnership has to be inclusive of informal groups, societies, NGO and SHG at village level. Existing interventions through various parties can also be selected for scaling up.

8.4. Begin with 100 districts:

The selection of the initial 100 districts should be based on free volition. A national level interaction session may be organised with leading public & private sector corporate & trade houses, to enable consensus on their participation in the national initiative.

The participants shall be free to choose one or more districts and adopt them as mentors. The mentors will then be responsible to work in partnership with the District Platform and shoulder comprehensive responsibility, inclusive of creating awareness, building capacities, holding customised training programmes, identifying products for priority integration into value and supply chain systems, delineating the total pathway, identifying the manpower & infrastructure gaps and resolving the same, advising farmers on production decision & 'production specifications & standards for profitable integration with the platforms, mobilisation of farmers etc.

8.5. Funding the Platforms

Funds will be required to set up, operate & manage the platforms at central, state & district levels, besides meeting the expenses on actual implementation. It would be possible to dovetail various ongoing schemes of different Ministries/Departments to meet the needed expenses. RKVY can be the primary source of funding at different levels. In addition, the Corporate/Trade bodies opting to become volunteers can be allowed to build revenue models for the activities they identify in the monitoring district as priorities for promoting them on value chain & supply chain basis.

8.6. Operational Guidelines

The Department of Agriculture, Corporation and Farmers' Welfare (DAC&FW), as the owner department, of this initiative should adopt & share operational guidelines covering all aspects, including organisational, financial, project/platform management, etc.

8.7. Outcomes from value chain integration

It is felt that agricultural projects have inherently moved from a phase of intensive cultivation and production, towards one that requires greater integration with market demand. While the government has various supporting schemes, incentives and programs to promote holistic development in agricultural marketing system, the actual integration needs to manifest within individual projects. It is felt important to have a mechanism that directs such support to specific projects, in a sector agnostic manner, such that the overall value chain system has opportunity across sectors and is developed at a national level, creating cross regional connections.

The proposed value system platform (NVS) is envisaged to target a system approach to value chain integration and bring about the following benefits:

a. Move away from disjointed sectoral schemes & programs in agriculture to well designed, commodity based integrated value chains that connect all the farmers, big or small, to their consumers - wholesalers, retailers, processors & exporters.

b. Prepare an ecosystem of value chain systems that integrate market demand with production, post-production & finance in a seamless manner, to ensure that the planned reforms in agricultural marketing, land leasing, contract farming and farmer producer organisaitons, have a base in commercial enterprises.

c. Promote greater private investment through adoption of Public Private Partnership framework across the system wide value chain for linking farmers to the market in an efficient & effective manner.

d. For each value chain, strengthen existing extension & agricultural advisory services by promoting relevant best practices like soil management, raised bed planting, ridge and furrow method of sowing, sub-surface irrigation, precision farming, post-harvest handling, commercial negotiations, market linkages, as well as credit and insurance facilitation.

e. Diversify the portfolio of integrated value chain systems from crops to animal husbandry, dairy, fisheries, horticulture, pisciculture, sericulture, aqua culture, mushroom cultivation to enhance the farmers' income.

f. Develop strong institutions of farmers to get the farmers integrated into the value chains through promotion of FPOs/ VPOs / cooperatives / SHG / JLG / Trusts / NGOs and get them federated along the commodity based market linked enterprises.

Key Extracts

- The implementation of sustainable approach to agriculture requires a 'fork-to-farm' approach, in order to form the appropriate market linkages in agriculture.
- A national level platform to support system-wide value chain partnerships is recommended

Chapter 9

Price forecasting

Forecasting of prices of farm commodities to augment predictability and stability of farmers' income is discussed. Pricing dynamics also stem from assessment of demand and accordingly adjusting supply.

9.1. Introduction

The instability in production due to over dependence on rainfall and climatic factors coupled with high volatility in prices have been eroding the predictability and stability of income earning capacity of farmers. Due to seasonality of production, derived nature of the supply and comparatively inelastic demand for farm products, there is a natural price variability by default in farm produce. Prices of farm produce are not only determined by local supply and demand situations but also influenced by global and exogenous socio-political factors that further exacerbate the volatility in agriculture. No country is an exception, and government intervention works alongside the free operation of market forces (i.e. supply and demand), in price discovery mechanisms of agricultural commodities.

As agricultural marketing is also characterised by policy interventions, the cost effectiveness of such interventions to minimise burden on government exchequer is crucial. What is vital is to sustain agriculture and improve the farmers' income earning capacity, including risk bearing ability in the wake of climate change on one hand volatility in the market on the other.

In this backdrop, market intelligence to strengthen the 'preparedness of farmers' to effectively face market volatility has assumed great significance.

Relevant information on future demand, price and production scenario not only assists the government but also helps the farmers, as useful **Decision Support System** to minimise risk and to augment their income. Forecasting of agricultural demand, prices and production is incorporates demand from agribusiness industries also. Such industries also establish decision support mechanisms for agri-products, which in turn translated into demand for the correlated agricultural produce. Correlating the demand with supply, also helps to optimise upon the use of ecological resources, the logistics and energy deployed, and the input costs. It thereby, also results in making agriculture greener, less wasteful and more profitable.

Hence, a framework for precise forecasting of agricultural prices, supply and demand, by developing proper mechanisms for collection, compilation, analysis of the appropriate data and the dissemination of the information has become a key objective for academicians and policy makers in India.

9.2. Theoretical Underpinnings

Forecasting is the art of predicting the likelihood of future events based on past and present information using econometric methods and models. Forecasts being quantitative estimate are frequently used as guide to public policy formulation and private decision making processes.

The crucial purpose of agricultural commodity price forecasting is to allow farmers and policy makers to make better-informed decisions and to manage various risks including price risk.

Time series analysis is usually carried out for forecasting future values. Time series data is recording on variables, like prices, rainfall, sales, etc., at regular intervals. Analysing time series data begins with an understanding of the four time series components, viz., Trend, Seasonality, Cyclical and Random variation. The trend decides the secular movements; increasing, decreasing or constant, of the series over time. The seasonal variation captures the season induced effects, the cyclical variation is the long term movement of a series similar to business cycles. The random variation in agriculture prices are due to stresses and shocks emanating from outside the system.

Auto Regressive Integrated Moving Average (ARIMA) models are class of models widely used to forecast complex data series. This model uses the past time series data of price to project the likely mean price and the volatility (range or standard deviation) for a period in future. The popularity of ARIMA model is due to its statistical properties as well as use of well-known Box-Jenkins methodology in the model building process. The technical details are in Annexure.

There are several other ways through which agriculture prices can be forecasted. Two such common methods are described briefly below:

(a) Demand and Supply Analysis: Here, by analysing demand and supply for a commodity, the end stock over the forecasting period is projected. Then changes in end-stock is related with likely changes in prices for the forecasting period. For each commodity, the end-stock is arrived at by differencing the total demand *(domestic consumption + export)* from total supply *(opening stock + production + import)*. The same data is updated once in quarterly and even monthly wise. For each crop, production is estimated state-wise based on the acreage and yield. Consumption is estimated based on past trends as observed in the National Sample Survey Organisation (NSSO).

There is a strong relation between changes in end-stock and the changes in future prices. From the historic relationships between the two variables, change in price for future period is projected based on the change in end-stock. As the method is elaborate and on a continuous basis, it can capture large changes in acreage as well as in yield (due to weather or other reasons) at the state as well as the country levels. Thus, the method has potential to throw-up data which can be used to initiate remedial actions on a dynamic basis.

(b) Use of Commodity Futures: This method involves using commodities futures market to understand the forward price curve, discontinuities in price structure and interpret them with reference to the cash or ready-delivery market. This in a way deciphering futures' price and developing a view on the markets**.** Commodity derivatives market is in its thirteenth year in India. Several agricultural commodities – maize, soybean, soy oil, turmeric, potato, cotton, rapeseed, wheat, channa, cardamom, etc. are actively traded in

the commodity exchanges. Till now, futures contracts of above mentioned commodities are traded in these exchanges. Futures contracts indicate the most likely future spot prices on the day of expiry. Well-participated and liquid futures contracts are excellent indicators of most likely future price. Such contracts give clear trends and discontinuity in the prevailing trends.

The various methods are best suited for produce that can be safely stocked for extended durations and would not apply similarly to short life commodities, like milk, tomato, mango, etc. These commodity types will rely more on projected production instead of stock in hand, for taking up a directed supply against demand projected for optimal price discovery.

9.3. Current Status of Price Forecasting

Over the years, though the Government of India has developed an elaborate system of estimation of crop sown area, yield and production of different crops, quality and timeliness of the data poses a big challenge in precise and error free forecasting and projections. Although multiple organisations are involved in compilation, monitoring and release of prices/price indices, currently no department is involved in forecasting prices/demand officially at the national level. A few attempts under 'project mode' are being attempted. They are:

9.3.1. Agricultural outlook & situation analysis for food security

National Council of Applied Economic Research (NCAER) has been implementing this project commissioned by Ministry of Agriculture & Farmers' Welfare. The NCAER forecasts prices of key commodities for short and medium term. NCAER has been using ARIMA method to project monthly Wholesale Price Index (WPI) based on the past data series taken from the Office of Economic Advisor. Price forecast covers 17 commodities and sub-groups namely rice, wheat, jowar, bajra, maize, pulses, gram, tur, onion, potato, groundnut seeds, rapeseed & mustard, soyabean, edible oil, and food products. The NCAER also forecasts medium term prices based on Harmonic Method for major 12 agricultural commodities. Except for soybean oil, palm oil and milk for which retail prices are used in the absence of wholesale prices. Medium term forecast covers wheat, rice, tur dal, chana dal, urad dal, masoor dal, mung dal, potato, onion, sugar, soy oil and milk. The indicative Delhi wholesale price data is used for the analysis.

9.3.2. Network Project on Market Intelligence

Initiated by Indian Council of Agriculture Research (ICAR), under the National Agricultural Innovation Project, this project was for establishing & networking of Agricultural Market Intelligence Centres in India. The project was in progress for a period of five years from 2013 to 17. The aim of the project was to help farmers in taking sowing and marketing decisions based on scientific information and to get better prices for their produce ultimately. Two types of price forecasts on agriculture commodities were generated and disseminated. 'Pre-sowing forecasts' are released to help farmers on sowing and area allocation decisions and 'pre-harvest-forecast' to take decisions on whether to sell the produce immediately or store for some period for price advantage in the future.

To generate price forecast and market intelligence advisories for 34 mandatory crops, responsibilities were assigned to consortium partners in different states on the basis of share of the crops in the country's area and production. Mandatory crops of the project included paddy, wheat, maize, sorghum, cumbu, ragi, blackgram, greengram, bengalgram, redgram, soybean, groundnut, sunflower, sesamum, mustard, copra, castor, rapeseed, cotton, potato, tomato, onion, small onion, brinjal, green peas, coriander, ginger, pepper, turmeric, red chillies, cardamom, coconut and arecanut. The National Institute for Agriculture Economics and Policy (NIAP) was the lead centre along with KAU, Vellanikara; UAS, Dharwad; UAS, Bangalore; ANGRAU, Tirupati; PDKV, Akola; JAU, Junagadh; MPUAT, Udaipur; CCSHAU, Hissar; PAU, Ludhiana and GBPUAT, Pantnagar as well as a few ICAR institutes as collaborating centres.

Time series data on the commodity arrivals and prices of the mandatory crops were collected from the regulated markets identified in each state to represent the crop. The data were subjected to statistical and econometric analysis using appropriate software packages. Price forecasting tools such as Moving Averages, Seasonal Indices, Single Exponential Smoothing, Double Exponential Smoothing, Co-integration analysis and models like ARIMA, ANN, SARIMA, ARFIMA, ARCH, GARCH to the real time market data were used in the project. Among them ARIMA model was found to be the best fit for most of the mandatory crops followed by SARIMA and Exponential smoothing in occasional cases. The price forecasts generated were validated by interacting with traders, farmers, other commodity specific websites and also in futures platform. In Karnataka, the responsibility to forecast prices of rice, maize, groundnut, sunflower, onion, potato, pepper, coconut, arecanut, turmeric and ragi was assigned to UAS Bangalore, the outcome was presented briefly below:

(a) During the project period of five years UAS Bangalore has generated 101 price forecasts in the state. The predicted price was compared with actual price prevailed in the market and the validity percentage was worked out. The validity percentages ranged between 85 and 96 per cent, reflecting the robustness of the predictability. The development of information technology had positive impact on knowledge sharing. Various dissemination methods including newspaper publications, local magazines, hard copies, e-mails, websites, text SMS and voice SMS were adopted to take the information to beneficiary farmers. The impact of the forecast advisory given by the centre for selected crops was assessed. The results showed that the income of the adopters of market advisory was higher compared to the non-adopters.

(b) Besides the mandatory objectives, commodity reports on selected crops like, sunflower, arecanut, and brinjal were also prepared. Baseline survey was done to create bench mark information on key project indicators, which supported monitoring and evaluation of the project. The objectives were; (i) to understand the current knowledge on market information and market intelligence, (ii) to know their current source of market information, (iii) to establishing baseline statistics to adjust and validate the project's

planned objectives and strategies focusing on the dissemination of marketing information/market intelligence problems within the targeted domain. Four stage simple random sampling method was adopted to accomplish the above objectives. Primary data from 100 respondents were collected for the years 2008-2009 and 2009-2010.

(c) Major findings of the study were that there was not much change in the cropping pattern among the farmers in the study period. However labour shortage, institutional arrangements, deficit irrigation, anticipation of better price have enabled 35 per cent farmers to modify their cropping pattern. Better price was the single largest factor that influenced the farmer's planting/sowing decisions followed by soil and land suitability, input availability and motivation from input dealers. Regarding market and price information, newspapers and private traders were the major sources to the farmers and internet searching was not used by them. Friends and relatives, radio, TV and regulated markets were occasional sources in getting market information.

(d) All the farmers required training on market information as they lacked experience in gaining that information. Most of the farmers sold their produce at farm-gate itself to the wholesaler and near farm markets. Most were using individual mini truck or van for transportation of small lot commodities to the sale point. Farmers sell their produce through brokers and commission agents mainly in distress, due to lack of further market connectivity. Marketing cost incurred by the farmers varied among crops and the major cost involved was on their transport. Very few farmers (3 per cent) were taking on any post-production activity on the produce in the form of grading, polishing and drying. These activities allowed them to capture greater value for their produce.

Data from the respondents who were provided regular information on price forecasts of the crops assigned to UAS-B were contacted to know their opinion on market intelligence and utility of the same. Perceptions of farmers at varying degree, on the effectiveness of the price forecast in a few selected crops are summarized below:

i) Maize: Among the respondents 82 per cent agreed that price forecast positively influenced their income while 18 per cent opined that the benefit realisation was good. About 68 per cent were highly satisfied with the market intelligence, while 32 per cent were satisfied and expressed their willingness to make use of such information in future. About 82 per cent were satisfied with the quality of forecast while 14 per cent of respondents were satisfied with the type of forecast provided. Regarding their decision to follow price forecast to sell the products, it was revealed that 57 per cent would definitely follow and 43 per cent of respondents remained undecided. About 82 per cent of respondents have strongly agreed to recommend to the fellow farmers the price forecasts they obtained. Majority (57 per cent) of respondents opined that both pre-harvest and pre sowing forecast were most useful, 29 per cent opined that pre-harvest forecast alone was useful, whereas, 14 per cent of the respondents expressed that pre-sowing forecast was most useful.

ii) Ragi: Nearly 63 per cent agreed that price forecast positively influenced their income while 38 per cent agreed strongly regarding the benefit realisation. About 87 per cent were highly satisfied with the market intelligence while 13 per cent were just satisfied and expressed their willingness to make use of such information in future. About 63 per cent were satisfied with the quality of forecast while 37 per cent of respondents highly satisfied with the type of forecast provided. Regarding their decision to follow price forecast for selling decisions, it was revealed that 25 per cent would definitely follow and 75 per cent of respondents agreed to follow the advocacy. About 75 per cent and 25 per cent of respondents 'strongly agreed' and 'just agreed' respectively to recommend to the fellow farmers the price forecasts of the centre. Majority (62 per cent) of the respondents opined that pre-sowing forecast was the most useful and 38 per cent opined that both pre-sowing and pre-harvest forecasts were useful.

iii) Red gram: Almost 79 per cent agreed that price forecast positively influenced their income while 21 per cent agreed strongly agreed that the benefit realisation was good. About 48 per cent were highly satisfied with the market intelligence while 52 per cent were 'just satisfied' and expressed their willingness to make use of such information in future. About 69 per cent were satisfied with the quality of forecast while 31 per cent of respondents highly satisfied with the type of forecast provided. Regarding their decision to follow price forecast for selling decisions it was revealed that 69 per cent would definitely follow and 31 per cent of respondents agreed to follow the advocacy. About 79 per cent and 21 per cent of respondents 'strongly agreed' and 'just agreed' respectively to recommend to the fellow farmers the price forecasts of the centre. About 40 per cent of respondents opined that both pre-harvest and pre-sowing forecasts were most useful, 35 per cent opined that pre-harvest forecast was useful, whereas, 25 per cent of the respondents expressed that pre-sowing forecast was the most useful.

iv) Banana: Similarly, 82 per cent agreed that price forecast positively influenced their income while 18 per cent agreed strongly that the benefit realisation was good. About 75 per cent were 'highly satisfied' with the market intelligence while 25 per cent were 'just satisfied' and expressed their willingness to make use of such information in future. About 90 per cent were satisfied with the quality of forecast while 10 per cent of respondents highly satisfied with the type of forecast provided. Regarding their decision to follow price forecast for selling the produce, it was revealed that 85 per cent would 'definitely follow' and 15 per cent of respondents agreed to 'just follow' the advocacy. About 82 per cent and 18 per cent of respondents strongly agreed and agreed respectively to recommend the price forecasts of the centre to the fellow farmers. Since the centre is giving weekly forecast, majority of farmers (75 per cent) were highly satisfied with the price forecasts received and the remaining 25 per cent opined that they would follow after ascertaining the quality and reliability of the forecasts.

v) Potato: Around 75 per cent of the beneficiary farmers agreed that the price forecast has marginally helped in getting better prices in the markets. Almost 89 per cent of the farmers were highly satisfied with the market intelligence while 11 per cent were satisfied and expressed that due to delayed rain they have shifted the area from potato to ginger. Nearly 82 per cent were 'just satisfied' with the quality of forecast while 18 per cent of respondents were

'highly satisfied' with the type of forecast provided. Regarding their decision to follow the price forecast for selling of commodities, it was revealed that 57 per cent would definitely follow and 43 per cent agreed to follow. About 82 per cent and 18 per cent of respondents 'strongly agreed' and 'just agreed' respectively to recommend to the fellow farmers the price forecasts of the centre. Majority (75 per cent) of respondents opined that both pre harvest and pre sowing forecasts were most useful, 20 per cent agreed that pre harvest forecast was useful, whereas very few (5 per cent) found that pre-sowing were also useful.

Indian Institute of Horticulture Research (IIHR), Bangalore was also a partner in the Network Project to generate and disseminate Market Intelligence for few horticultural commodities. Through the project, arrivals and prices of tomato were analysed using econometric methods such as ARIMA. The predicted prices were provided every season to farmers of Kolara, in Karnataka prior to sowing and harvest. These predicted prices were found be accurate to the extent of 90 per cent in comparison with the actual market prices discovered later on and thereby benefitted both farmers and traders in taking informed marketing decisions in the region. In addition to tomato other horticultural crops such as onion, grapes and pomegranate were also covered under the program. The researchers have opined that simple ARIMA methods may not give accurate forecasts. In spite of difficulties in getting the data in required form it is advocated to include **exogenous variables** like weather parameters to enhance the adequacy of the model. Similar results were found in other network centres where ever the forecasts were done appropriately. The NIAP project ended in March, 2015.

9.3.3. Project to forecast prices of major 19 agricultural commodities

This network project was initiated during 2015-16 in Karnataka with financial assistance from Karnataka State Agriculture Marketing Board, Bangalore. The responsibility was assigned to 3 Agriculture Universities located at Bangalore, Dharwad and Raichur. The commodities selected were paddy, sorghum, maize and ragi under cereals; bengal gram, red gram, green gram and black gram under pulses; groundnut, sunflower and soybean under oilseeds; dry chillies, cotton, coconut, arecanut and turmeric under commercial crops; and tomato, potato and onion under vegetable crops.

Rigorous time series econometric models like, Moving Averages, Single exponential Smoothing function, Double exponential Smoothing function, Halt-Winters Model, Auto Regressive Integrated Moving Averages (ARIMA) and Artificial Neural Network (ANN) models were used. Depending of the lowest **Mean Absolute Per Cent Error** (MAPE) values, the best suited models were selected for determining the price forecasts. The results of the models were taken as the base for further post-analysis diagnosis.

Apart from forecasting, traders' survey, consideration of future market prices, changes in the government policies, weather changes, import and export situation, prices of competitive commodities and a shift in the crop area at district, state and country levels were considered in the Post-analysis diagnosis. In this way study further fine-tuned the methodology to encompass several markets for individual crops.

The price forecasts were released during the 1st week of every month for the next eight weeks. After the release of the price forecasts, dissemination of market intelligence were also carried out through television and FM Radio. Publications through print media in two periodicals related to agriculture; *Krishi Munnade* and *Vyavahaara Jagattu* was also made regularly. The validity of the forecasts were done through comparing the price differentials between the predicted and actual price range in the course of time. The validity of the forecasts were worked out which indicate a near prediction in crops like paddy (75-100 per cent), redgram (73-96 per cent), groundnut (83-100 per cent) cotton (92-100 per cent) and bengal gram (94-100 per cent) while the forecasts were weak in the case of black gram for Mysuru market. The market intelligence in the form of price forecast was preferred by a number of farmers and used while deciding cultivation of commercial crops such as oilseeds, pulses and vegetables. A number of enquiries were received soon after the telecast of the price forecasts over Doordarshan TV. Besides prices, the farmers also were eager to know the area under the crop and the expected production. Farmers had expressed their willingness to receive the messages even on their phones in case it was provided as they were already receiving the SMS on current prices in selected markets.

9.4. Case Study - initiatives by KAPC

The Government of Karnataka constituted the Karnataka Agriculture Prices Commission (KAPC) as an advisory body to deal with aspects of scientific costing and pricing of farm produces, competitive market structure and all other issues related to farmers', income and welfare in the state. In order to accomplish the major mandate of timely dissemination of market intelligence and information to policy makers as well as to farmers a project was assigned to School of Food Business, Diary Sciences College Hebbal Campus, Bengaluru coming under Veterinary University (KVAFSU) Bider, to construct an Interactive Dashboard for real-time prices forecast for principle agriculture and horticultural commodities of Karnataka. Accordingly the dashboard was designed & developed as 'Decision Support System (DSS)' with the active support a Bengaluru based software company.

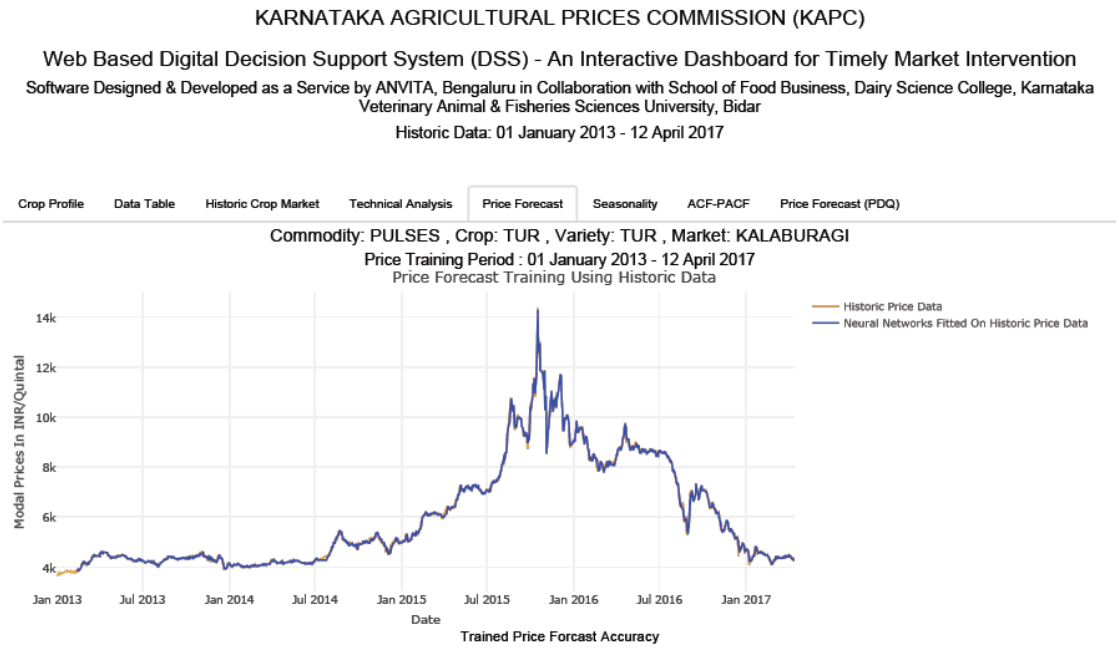
Other objectives were to design statistical learning models for analysis of available agriculture & horticulture prices & arrivals data and to facilitate comparison of the crop forecast prices with cost of production, market prices as well as minimum support price (MSP) for selected 25 crops, to begin with.

Monthly price data was obtained from government of Karnataka website: Krishimaratavahini and AgMarkNet of government of India for twenty-five selected crops from the 1st January 2002 to 12th April 2017. As the quality of the data was a concern, manual data cleaning and pre-processing to required format were performed. Designing of univariate statistical methods through ARIMA, artificial neural networks, and technical analysis for crop prices and seasonality index for arrivals were undertaken. The mean absolute per cent error (MAPE) was kept minimum thereby leading to accurate crop prices forecast trends. And finally, automation of the methods for selected crops and the interactive dashboard for better and ease of

visualization of the results were developed.

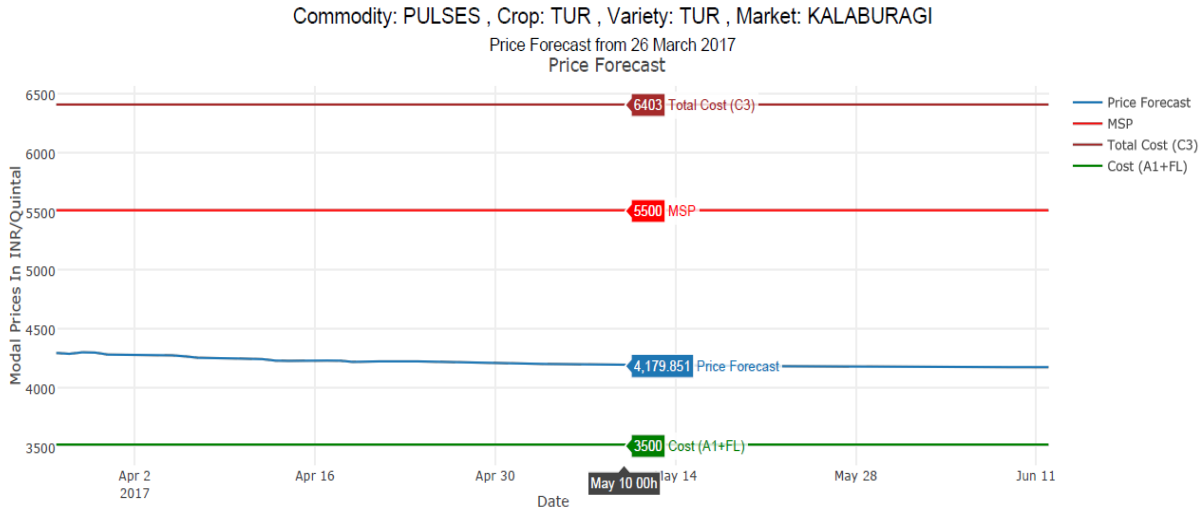
The model provided accurate forecast of price trends compared with current market data. Figures below obtained from the dashboard depict the price trends of actual and predicted data.

Figure 9.1 Price Forecast Training Using Historic Data



Dash board so envisaged serves twin purposes of predicting the future prices as well understanding behaviour of the market for any government intervention programs. As a first step, as shown in Fig 17 forecasted values are superimposed on actual data which are almost moving in unison depicting the accuracy of the model.

Figure 9.2 Price Forecast, MSP, and Cost



In Fig 18 forecasted price of Tur in Kalabuargi market is compared with the prevailing MSP and cost of cultivation of that crop. The forecasted price was much higher than the cost of production actually borne by the farmers plus imputed value of family labour (called Cost A_1

+ FL under CACP parlance) during forecasting period.

There was no likelihood of prices catching up with MSP notified by Government, let alone covering the total cost of production (C_3) that includes rental value of own land and managerial cost. This indicated a shortfall in the market intervention.

Such forecasts are not only a precautionary to farmers but also a pointer to government to undertake procurement operations till market price picks up. Accordingly, the government of Karnataka procured record 32 lakhs quintal Tur from farmers in the current year. Despite the intervention, the prices are yet to be stabilised owing to other exogenous factors.

Figures 20 & 21 indicate seasonality of arrivals along with price trends which help in understanding critical time periods for close watch on market behaviour for necessary action..

Figure 9.3 Arrival Seasonality Index

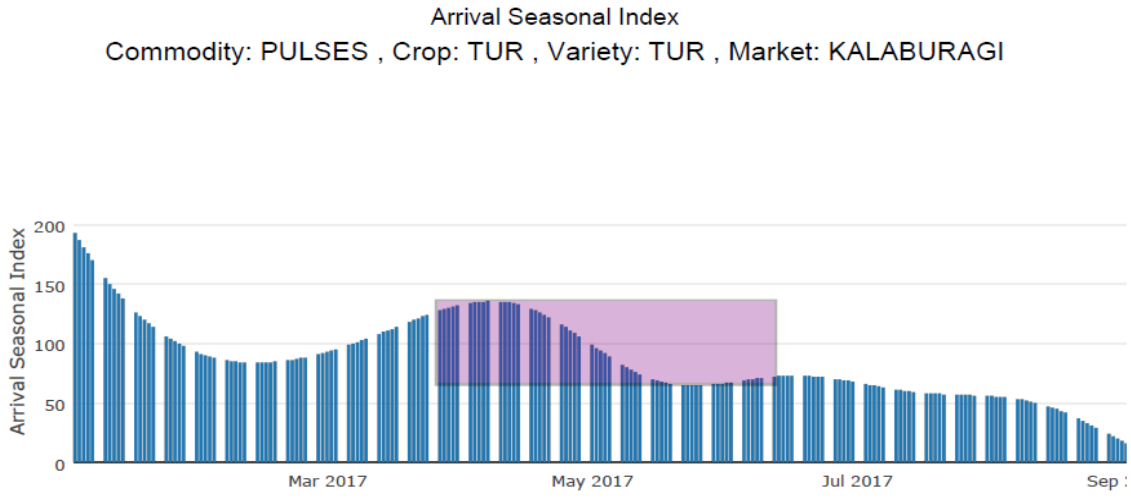
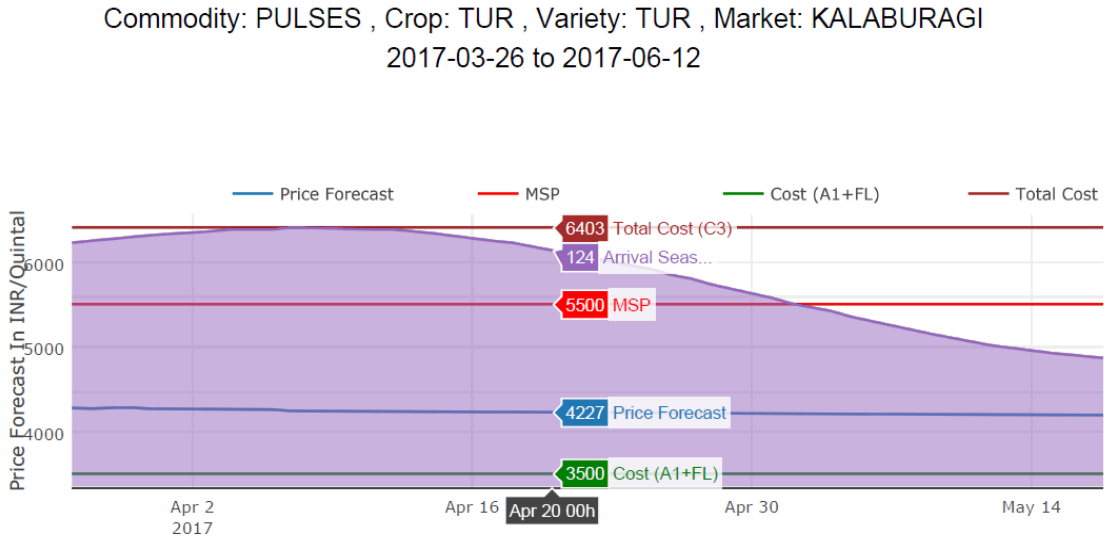


Figure 9.4 Price, Costs, MSP and Arrival Seasonal Index Superimposed



In this way, the dash board becomes an effective **Decision Support System** (DSS) tool for policy makers to keep a watch on the market situations to take necessary interventions and policy measures to stabilize the price as well as income earning capacity of farmers.

9.4.1. Collaboration with Experts

At present, forecasting prices of a commodity is based mostly on the historical price data of the same commodity. However, need of the day is to project likely production along with forecast the price of an agriculture commodity using a dynamic models that incorporate all possible explanatory factors. In addition to historical prices, array of factors such as yield, rainfall, temperature, stocks, trade (imports and exports), unforeseen factors like political uncertainty, strikes, etc. influence future price and production of a commodity which need to be considered while designing Multivariate Models.

Indian Institute of Management- Bengaluru (IIM-B), has envisioned to lay the foundation for a long-term collaboration with Karnataka Agriculture Price Commission (KAPC) in this regard. The key objectives envisaged are:

- **Development of Supply Projection Model** using all relevant variables as a critical tool for governmental agencies to plan interventions to ensure proper pricing and adequate supply and execute futures contracts for crop prices, crop import and export at a state-level.

- **Price Forecasting Model** to help farmers in determining the right choice of crops and to take corrective measures mid-season if the choice of crops cultivated doesn't work out.

- **Area Estimation Model** both for the supply projections and price forecasting models. Currently, the techniques used to estimate area under cultivation are manual and inaccurate.

- **Demand Projection** by making use of Advance estimates that the Directorate of Economics & Statistics publishes periodically relating to production of agricultural commodities along with the historical data on production and prices of different agricultural commodities.

The KAPC has initiated a project in association with Microsoft India limited in this regard. It is proposed to involve all relevant institutions including SAUs and IIM-B to develop multivariate models that will cumulatively form a tool that can be integrated into the existing KAPC dashboard. The models are thematically presented in the diagram below:

An initiative by establishing network of premier institutes like IIMs, IITs, ICAR centres, SAUs and other public sector bodies is needed in all states as well as in the Centre that would go a long way in further systematizing farm commodity price forecasting and supply projection endeavours in India.

9.4.2. Collaboration with private sector

Karnataka State Department of Agriculture entered into an MoU with Microsoft India Ltd to undertake an ambitious project, under the overall supervision of KAPC, for projection of supply and forecasting of prices of important farm commodities by developing Multivariate Models. The model proposes to incorporate apart from prices, other exogenous variable like weather, rainfall, trade and so on mentioned above. The output that emerge from the above collaboration will be displayed through KAPC dashboard.

Major challenge in this endeavour effort is to collate realistic information on above mentioned multiple variables on both spatial and temporal spread, defining the likely impact of these factors to adopt them for machine learning so that synthesised likely scenario or outlook for a given commodity is arrived at.

This effort calls for use of Information and Communications Technology (ICT) and more specifically Cloud-Based Technologies that are relevant to build robust platform services leveraging Machine Learning based Models.

9.4.3. Web and Android based software

The KAPC is also attempting to develop web and android based software for online as well as offline collection and analysis of field data pertaining to cost of cultivation and marketing of major agricultural and horticultural crops of Karnataka. This initiative involves five Agriculture and Horticulture universities in Karnataka along with a Bengaluru based private software company. The structured data that is collected can be utilised to compute accurate costs, production and return estimates for agricultural and horticultural crops automatically without any manual intervention.

The results will be used online for supply projection and price forecasting under envisioned multivariate models. This way, over the course of time, it is intended to have the software customised to capture relevant data that can generate reports for farm planning and budgeting analysis, inventory analysis, cost and return analysis with traceability metrics while identifying and spreading best farming practices with price forecasting so as to address the issue of enhancement of farmers income in a most precise way.

9.5. Limitations and Remedies

There are limitations to such analysis and assessments depending on quality, type and harmonisation of data

9.5.1. Quality of Time Series data

The Committee for Forecasting Prices, headed by Chief Economic Adviser that submitted its report in November 2016, pointed out several lacunae pertaining to the quality of the data related to arrivals and prices of farm commodities generated by the Directorate of Economics and Statistics, and other agencies in India. The key issues raised are:

a) At present multiple agencies are collecting arrivals and prices data at the centre and state levels resulting in duplication of efforts.
b) Data from different sources can't be compared for want of uniformity in concepts, commodity description and grading**.**
c) Absence of uniform FAQ and grading standards, as substantial number of transactions are reported under 'others' variety category.
d) Arrivals and prices data have inherent gaps and the flow of data also suffer from issues like irregular reporting, non-response, reporting of unreliable data.
e) Lack of proper monitoring mechanism for recording accurate data and errors at data entry level due to lack of proper training as data entry operators, in many cases, are not regular employees.
f) Lack of transparency in price discovery, especially in wholesale prices due to urgent need for computerized auction system.
g) No uniform reporting system to AGMARKET portal and non-reporting from many markets.
h) Lack of uniformity in wholesale prices collected by the Department of Consumer Affairs and there is no clarity on variety and specifications.

Considering the above limitations in current agriculture data generation system, the Committee made several important recommendations that need to be implemented immediately.

Adequacy of the Data: The magnitude of unaccounted sale and illegal transactions of farm commodities outside the preview of the regulated market (APMC) and other formal systems that is rampant across the country, hence a real cause for concern. This lacuna limits adequacy in the volume of the data generated and hence greatly affects precise prediction of prices of farm commodities. For instance, in Karnataka, as per the report by KAPC, out of total production from fifteen major agriculture and horticulture crops only 41 per cent was bought and sold in various Regulated Markets (APMC yards) of State during crop year 2014-15. Formal transaction with in the APMCs is abysmally low in the cases of jowar (just 5 per cent), ragi (7 per cent), soybean (21 per cent), tomato (24 per cent), bengal gram (26 per cent) and cotton (28 per cent). Time involved in transportation, pre-harvest contract with the local money lenders and traders, quality constraints are the main reasons for selling produce outside the APMC purview.

A comprehensive strategy encompassing legal enforcement coupled with incentives to sell with in the regulated and formal market preview, extending the scope of formal transaction to village level etc. should be a top priority.

Multiple Agencies: At present four agencies are involved in generating data on market arrivals and prices of farm products at Centre and State levels. This not only results in duplicity of efforts, but also create divergence in the data provided.

A strong and unified institutional arrangement at the centre, and its arms at the state to generate and timely dissemination of quality data on crop area, production, prices, marketing etc. at the disaggregate level should be thought of immediately.

Univariate Models: The ARIMA model, currently used universally for price forecasting employs single variable i.e. past price thus leaving other important exogenous variables such as weather, rainfall, and so on that affect the predictability significantly. There is ample scope to employ multivariate models such as **Transfer function**, **Intervention analysis**, and **Vector Autoregressive** (VAR) models discussed earlier. These models have to be built after isolating the independent variables that have a significant bearing on the variable being studied. The main problem with the exogenous variable is that their effect could be stochastic and not deterministic in which case its effect cannot be captured in the model appropriately. Since the data is high velocity in nature, the independent variables should have the same frequency or else a proxy variable or a dummy variable should be included to capture its effect. Most of the multivariate models in the ARIMA framework use errors of the ARIMA model as the dependent variable and add exogenous variables to explain the variation in it. And this forms the basis for a multivariate model. However problems in employing multivariate models while forecasting the prices are:

i. They have a greater requirement of data than univariate models. Every additional variable has to be estimated that brings in an additional source of error due to sampling variation.
ii. Model selection is therefore more complex and lengthier and more susceptible to errors, which can affect predictions later on.
iii. It is difficult to generalize nonlinear procedures to the multivariate case. Generally, multivariate models must have a simpler structure than univariate ones so as to overcome the additional complexity that is imposed by being multivariate. Then, multivariate models will miss the nonlinearities that are handled properly by the univariate models
iv. Outliers can have a more serious effect on multivariate than one univariate forecasts. Moreover, it is easier to spot and control outliers in the univariate context.
v. Identifying the lag structure of leading variables may be challenging at times.
vi. The quality of the data has to be very good and data on causal variables have to have the same velocity as the prices.

Notwithstanding various constraints, concerted efforts should be made to develop and use **Multivariate Models** to project **Crop Supply**, **Price Forecast** and **Crop Area** estimation for strategically important crops by generating data through modern predictive analytics developed with satellite data, ancillary data, ground truth and machine learning algorithms.

9.6. Measures to implement Market Intelligence

Market Intelligence will also require strengthening the data collection and collation mechanism for crop forecasting. The modern scientific tools and techniques, of the Mahalanobis Centre and other related central and state level agencies need to be developed at the production level. At the same time, complete mapping and updating of soil health analysis and water resource management will be needed. On the output marketing front, a dedicated agency for analysing demand, supply and related price discovery requires to be established. Necessary analytical tools and will be needed to evaluate the following, across various agriculture sectors:

a) Trends correlated across seasons for harvested quantity – crops, fish, livestock produce
b) Trends on demand for each sector – food, non-food – crops, fish, livestock produce
c) Projections of demand for all major markets.
d) Analyse demand versus market price on basis of supply variations
e) Forecasting prices and analysing international price trends vis-à-vis trends in India.
f) Switch to online auctions in all markets including APMCs across India in a phased way.
g) Set up a Harmonized Market Information System covering all the wholesale markets.
h) Target a monthly, semi-annual and annual demand and price forecast bulletins in initial 5 years. Progress to issue decadal forecasts and projections.

The existing web, mobile and mass media modes of communication can be used to disseminate the information to farmers and the agri-logistics sector.

Tap into existing experience of state level organisations like the Karnataka Agriculture Prices Commission to undertake pilots to develop a national network of price analysis. Active involvement of private IT sector and civil society in "Generation and Dissemination of Forecasts and Projections" can be planned. A national Value System Platform can be simultaneously launched to take advantage of the market intelligence and develop operations that use such information as exemplifiers.

9.7. Restructuring DMI

There exists a **Directorate of Marketing & Inspection** (DMI) that is functioning since pre-independence under Ministry of Agriculture. A large number of its mandated roles are now anachronistic. This Directorate has a number of field units across the country.

This committee is of the view, that the DMI can be restructured with respect to its roles and responsibilities, manpower, and field unit reorganisation to meet the current demand of price supply and demand forecast. Since there already exists a large number of resources with particular qualifications recruited to meet the past mandate, they can be retrained and reoriented and positioned appropriately to undertake market intelligence functions. Into a fully equipped and empowered **Directorate of Marketing & Intelligence**.

The Directorate of Marketing and Inspection (DMI), an attached Office of the Department of Agriculture, Cooperation and Farmers Welfare under Ministry of Agriculture & Farmers Welfare, was set up in the year 1935 to implement the agricultural marketing policies and programmes for the integrated development of marketing of agricultural and other allied produce in the country with a view to safeguard the interests of farmers as well as the consumers.

The mandate of the DMI has undergone several changes over a period of time depending on the policies and programmes of the Government.

A restructured DMI can take on some of these following functions:

i. Strengthen Agmarknet portal and collect and collate real time data on market arrivals and prices for all commodities from across the markets in both private and public sector
ii. Collect and collate data on production of all produce (agricultural, horticultural, plantation, livestock, etc.) and maintain time series data in this regards.
iii. Monitor global commodity prices and production estimates for major commodities from price leading countries and maintain time series data.
iv. Promote standardisation and grading of agricultural and allied produce under the Agricultural Produce (Grading and Marketing) Act, 1937.
v. Promote harmonisation of standards for all produce by working closely with other standardisation authorities, like BIS, FSSAI, etc.
vi. Identify various sources of data on prices, demand and production, such as Directorate of Economics Statistics (DES), Agrimarknet, Dept. of Consumer Affairs (DoCA), NSSO, National Accounting system, etc.
vii. Develop mad adopt a suitable model for forecasting prices for select produce and develop potential to forecast supply and demand subsequently.

Deployment of forecast data: The primary objective of a forecast well ahead of the production season, is to enable the farmers themselves to undertake an informed decision on their production with a view to earning optimal returns. Such a forecast would also help other stakeholders in the supply system (like traders, processors, exporters, importers, etc.), as also the government concerned with consumer interests to plan for their activities and initiatives.

However, the accuracy of the forecast particularly when univariate model is adopted, will depend upon the credibility and robustness of the data collated. In the opinion of this committee it will be appropriate to commission a forecast system but limit its use to government initially. The government over a period of three to five years can watch the correlation between the forecast and actual price, and make necessary corrections to the model before opening for public use.

Key Extracts

- The government of India has developed an elaborate system of estimation of crop sown area, yield and production of different crops, quality and timeliness of the data poses a big challenge in precise and error free forecasting and projections.
- Although multiple organisations are involved in compilation, monitoring and release of prices/price indices, currently no department is involved in forecasting prices/demand officially at the national level.
- Restructuring of Directorate of Marketing *Inspection* into the Directorate of Marketing *Intelligence* will provide a solution at national level for reliable and timely price forecasting in a sustainable way.

Chapter 10

Recommendations

This chapter highlights the key recommendations that relate to agricultural marketing, and highlight the necessary reforms in the marketing support system, relook at the market architecture, and brings in a value system approach with participation from the private sector.

10.1. Synopsis

Growth in farmers' income is directly related to their capacity to market the produce across time and form at location of choice. This capacity is related to the system of marketing, the network of markets, the inter-connectivity between these markets and the intelligence to guide the activities. The recommendations that follow are from the discussions in this volume, are in affirmation of the understanding that the scope of agriculture is getting redefined as per contemporary and emerging needs.

As demand driven production of agricultural produce, rather than production propelled marketing is the need of the time, the Committee reiterates that agricultural marketing has a function to guide the flow of produce from farm-to-fork, through the flow of information from fork-to-farm, so as to fulfil the demand in a way that it results in optimisation of cost and maximises value realisation.

10.2. Recommendations

i. States must adopt the Model APLM Act, 2017, and promptly facilitate the provisions for establishing of a range of markets of different models (eg. wholesale, retail, direct markets, etc.) under a wide variety of ownerships (public and private) – see section 3.9.2

ii. DACFW must forthwith roll out the Model APLM Rules so that the States can make the Model Act operational.

iii. As estimated, the country would need about 10,000 wholesale and about 20,000 rural retail markets to achieve the desired market density and network them into a pan-India system.

iv. In order to achieve the desired density, the state governments may convert the existing principal and sub-market yards into full-fledged and independent markets under the provisions of the Act. While this will take the total number of wholesale markets to more than 6600, the remaining requirement of about 3500 may be met by promoting private markets under the provisions of the Model APLM Act. Also, in response to the provisions of the Act, existing warehouses, silos, etc., may be upgraded as markets and notified as such.

v. As per the new market architecture suggested in chapter 5, the effectiveness of an efficient marketing system can be gained by upgrading the existing more than 20,000 rural periodical markets as Primary Rural Agricultural Markets (PRAMs)

vi. The Centre and the States should work concertedly to achieve a truly unified national agricultural market (NAM) within a period of three years (ie. 2019-20). This can be achieved by increasing the coverage of markets under e-NAM to a cumulative of 1000, and promoting alternate online platforms in the public sector by the states, as well in the private sector, besides joint venture platforms. In order to facilitate this Government of India's e-NAM platform may serve as a common platform with inter-operable architecture, so that all other platforms can be integrated centrally, and with one-another.

vii. The Ministry of Agriculture would need to adopt an open source software at the earliest, and lay down IT system standards and specifications to be adhered to, by one and all platforms.

viii. Both the Centre and the States/UTs may set up special purpose vehicles (SPV) to own and operate the national agricultural market (NAM). To realise this, the DACFW may appoint an expert to give specialist advice on the transactions involved.

ix. DACFW may constitute an inter-ministerial committee to study and suggest ways to harmonise the various product standards and grading parameters adopted by different agencies (BIS, APEDA, FSSAI, Agmark, etc.). This is a pre-requisite to creation of a NAM which works on the online platform.

x. As discussed in chapter 7, the small and marginal farmers will benefit from an efficient marketing system, only if they are imparted withholding capacity, by offering them pledge finance (post-harvest loan against produce as collateral). This can be facilitated by taking measures to upgrade the storage godowns including cold-storages, to standards as defined by WDRA, to issue NWRs. DACFW may develop comprehensive guidelines to promote warehouse based post-harvest loans and eNWR based trading.

xi. Further, the availability of post-harvest loans against NWRs, should be popularised amongst farmers, and financial institutions oriented to participate in the pledge loan system. The government may revisit the guidelines/eligibility criteria relating to post-harvest sub-vented loans, so as to make it available to small and marginal farmers, even when they may not have availed themselves of a crop loan.

xii. State governments may prepare a District and State storage plan and identify gaps before taking up new constructions. The gaps may exist in the existing available infrastructure, in the form of design, technology used and/or crop specificity.

xiii. As another intervention for integrating small and marginal farmers into the market system, besides improving their external market interface, mobilising them into a large number of farmer producer and village producer organisations (FPO/VPO) is critical. It is suggested that a minimum target of 7,000 FPO/VPO be adopted. Each such organisation may cover 1000 farmers and/or 1000 hectares.

xiv. In order to scale up the FPO/VPO it is suggested to liberalise, by amending the Companies Act, to facilitate private sector shareholding in FPOs which may be allowed

upto 26 per cent. They may also be incentivised by treating them at par with Cooperatives.

xv. The FPOs/VPOs may be organically linked to the proposed national level value system partnership platform – see chapter 8.

xvi. To promote value led production system, the DACFW may develop guidelines and launch an Agriculture Value System Partnership Platform which will function through an organisational structure that comprises national level, state level and district level platforms. The DACFW may identify interested stakeholder organisations with expertise and experience in various production and post-production activities, who are willing to partner with the District level value system platforms and mentor the farmer's enterprise.

xvii. The doubling of farmers' income strategy will also involve productivity gains across sub-sectors, which will result in a higher output, and they need to be connected with new markets, within and outside the country. Hence, focus on agricultural exports is important. The aim should be to raise the agricultural export by a minimum of three time by 2022-23, to reach a target of USS 100 billion of exports. Further the basket of commodities exported should be broad-based and reach beyond cereals and meat, which today account for the bulk of the exports.

xviii. Promotion of exports will require a steady state duty structure for import / export; gaining market access across the globe; and building a track and trace system to comply with international norms.

xix. In order to adopt a track and trace system for exports, the DACFW and APEDA should work together and partner with the state governments and promote cluster based production and export marketing. The focus should be on fresh produce like fruits and vegetables, which have great potential in production gains but are already facing constraints in marketing. On priority, the initial 10 clusters already identified, may be made operational, and in parallel identify another 10 more by the end of 2017-18 to be operationalised in the following year. This initiative should be scaled up by linking organically with the value system platform and FPOs/VPOs.

xx. The export and the domestic market are effected by the trade regime. It is suggested that a long term perspective be adopted, such that there are no knee-jerk reactions that result in fluctuation in the duty structure and disable the associated trade relationships. Further, a permanent inter-ministerial committee including those of commerce, consumer affair and agriculture may be constituted with the mandate to monitor closely the domestic and global price situation for different commodities, and recommend to government the needed changes keeping in mind the conflicting interests of the producers and the consumers.

xxi. The above referred committee may be supported by DMI (Directorate of Marketing & Inspection) as its secretariat. The DMI may collect and collate data from different sources to analyse and provide inputs to the Committee.

xxii. It is also suggested that DACFW may undertake the restructuring of DMI into the Directorate of Marketing & Intelligence so that it is able to advise the government on market prices as related to the farmer-producer. DMI for this purpose, may adopt a suitable price forecasting model as discussed in chapter 9. However, this forecasting may be initially shared with caution until its eventual robustness is verified and demonstrated.

xxiii. DACFW should broad base and strengthen procurement operations to cover as many crops as possible (other than wheat & paddy) and be secular across the production regions. It is suggested that the procurement operations be conducted with view to stabilising market prices and not as income transfers. This will require the government to adopt a procurement threshold level of 15, 10, 5 per cents, of the marketed surpluses for pulses oilseeds and other cereals, respectively.

xxiv. The bouquet of procurement instruments can be strengthened and made more broad-based by adopting new initiatives like the market assurance scheme and the private stockist scheme – see chapter 6.

xxv. The buffer stocks of pulses, built under PSF, may be linked to procurements undertaken under PSS, MAS and private stockists. This will enable the procurements undertaken at MSP to be off-loaded into the PSF buffer for stabilising the consumer markets.

xxvi. DACFW may re-designate the existing Marketing Division into Agri-logistics and Marketing Division. This will bring dedicated focus on the empowering aspects of agriculture, i.e. agri-logistics and agricultural marketing. For this purpose all agri-logisitics and market related functions dispersed across different divisions may be consolidated in the re-organised division.

xxvii. While marketing is important to give appropriate price signals and help farmers to take informed decision on their production, the latter should not be in violent departure from the local agro-ecological and climatic demands. This implies, that certain crops become inevitable under certain conditions of ecology, even when market signals may not favour them. Under such situation, monetisation of the farmers produce can be triggered by creating a demand for such produce. A cafeteria of such crops and commodities would include hardy crops like millets, organically grown produce, indigenous animal breeds, and certain other traditional crops that are original to specific geographies, over which farmers have a right. These kind of crops and commodities should be encouraged, by undertaking the analysis and authentication of their inherent nutritional values and unique characteristics; creating awareness through aggressive marketing promotion; and, linking them to organised retail including portal based retail.

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Annexures

Main features of PPPIAD

At its conception, the following were the main features under PPPIAD:

- Corporates to propose integrated agricultural development projects across the spectrum of agriculture and allied sectors, taking responsibility for delivering all the interventions through a single window. Each project to target at least 5000 farmers, spread over the project life.
- Complete flexibility in design, but ensuring an integrated value chain approach, covering all aspects from production to marketing. Projects can span 3-5 years.
- Average investment per farmer during project must be quantified, though an average of Rs. 1.00 lakh per farmer will be a desirable benchmark. Government support will be restricted to 50% of the overall per farmer investment proposed, with a ceiling of Rs. 50,000 per farmer through the project cycle. The remaining investment will be arranged by the corporate through institutional financing and its own and farmer contributions. All subsidies will be directly routed to farmers or reimbursed to project leaders after verification of asset distribution to farmers.
- Key interventions which must feature in each project are: a) mobilizing farmers into producer groups and registering them in an appropriate legal form or creating informal groups as may be appropriate to the area and Project (joint stock or producer companies, cooperatives, self-help group federations etc.); b) technology infusion; c) value addition; d) marketing solutions; e) project management.
- Financial assistance will be provided by State Governments directly to corporates through the RKVY window after the project has been approved by SLSC, subject to a ceiling of Rs. 50,000 per farmer or 50% of the proposed investment per farmer, whichever is lower. Subsidy to farmer for availing drip/sprinkler irrigation/mechanization/grading/shade nets etc. could be considered separately as it is a large investment. Therefore, subsidy availed by farmers for drip/sprinkler/ mechanization/grading/shade nets, etc. under NMMI would not be considered as a part of this Rs. 50,000 ceiling.
- Projects can also be proposed by corporates to State Governments through Small Farmers' Agri-business Consortium (SFAC). This institution has been designated as a National Level Agency for this purpose by Dept. of Agriculture and Cooperation, Govt. of India. SFAC will act as a facilitator to link the project promoter to the concerned State Government. The role of SFAC will be to examine the proposal from a technical viewpoint and thereafter propose it for funding to the concerned State. SFAC will be restricted to being a support agency to facilitate the process of technical appraisal, coordination and facilitation; it will not be involved in implementation directly or handling funds.
- An independent monitoring agency (like NABARD or other a suitably qualified consultancy firm with no conflict of interest with the particular project it is to monitor) will be appointed by the State Government to closely track the performance of the project and report to all relevant stakeholders in the State and Central government.

Objectives

Main objectives of scheme are:

Augmenting the current government efforts in agricultural development by leveraging the capabilities of the private sector by:

- Addressing all concerns related to production and post-harvest management in agriculture/ horticulture and agriculture allied sectors.
- Enhancing production and productivity, improve nutritional security and income support to farmers.

- Promote, developing and disseminating technologies for enhancing production and productivity.
- Assisting states in addressing the entire value chain, right from the stage of pre-production to the consumers table through appropriate interventions.
- Creating employment generation opportunities for skilled and unskilled persons, especially unemployed youth.
- Improving value addition and ensuring farmer's profitability increases.
- Making farming a viable business proposition.
- Improving the delivery and monitoring mechanism under RKVY funded projects.

Strategy

To achieve the above objectives, the scheme will adopt the following strategies:

- Companies to submit a Detailed Project Report (DPR), to States directly or SFAC for consideration of SLSC.
- Organise growers into Farmers Association/Groups in every project.
- Identify/select aggregators and enable tie-up with farmers/associations/groups.
- Coordinate with ICAR/SAUs/Private Sector to provide improved varieties of seeds/seedlings and to introduce innovative technologies as required.
- Addressing issues in the credit supply chain with support from NABARD.
- Measures for production and productivity enhancement by adopting improved cultivars, production
- technologies using precision farming techniques, protected cultivation, micro irrigation etc.
- Primary processing, sorting, grading, washing, packaging and value addition clusters.
- Logistics from farm to market including:
    - Post Harvest Management, Storage and Transport infrastructure.
    - Aggregators for suitable tie ups in the supply-chain.
- Support to these groups to develop warehouses, cold chains, Controlled Atmosphere (CA).

Strategy and Roadmap

Companies will identify the regions they wish to take up in 2012-13 and develop the project for integrated agriculture development. The strategy & road map formulated by companies should invariably contain information on geography & climate, potential of agriculture development, availability of land, SWOT analysis, and strategy for development and plan of action proposed to be taken to achieve goals in the identified region.

The document should focus on adoption of cluster approach for production and linking with available infrastructure, or to be created, for post-harvest management, processing, marketing and export. Growers/farmers would also be entitled for assistance under all schemes of DAC/other departments of Government of India so that these schemes can ensure appropriate synergy and convergence for maximum benefit in the field. Each DPR will also provide a Results Framework Document (RFD), giving clearly verifiable indicators for tracking the progress of the project during its life cycle.

Implementing Agencies

1. Small Farmers Agri-Business Consortium (SFAC).

2. State Government (Agriculture Department)/State level agencies.
3. Private sector partner.

Proposals can be either submitted directly to States or to SFAC at the national level. In either case, the NLA or State Government will examine the project proposal from the viewpoint of suitability to priorities and objectives of the State and the general framework of RKVY. If found suitable, the proposal will be forwarded to the SLSC chaired by Chief Secretary for consideration. Based on the approval of the SLSC, the project will be rolled out after an agreement has been signed between the State Government and Project Promoter. A standard format of agreement for PPPIAD under RKVY will be circulated for the guidance of States. They will be free to adapt this format to their specific needs.

All fund releases will be made directly by the State Government to the concerned private sector Project Promoter, based on satisfactory progress reports. Funding will be in the form of reimbursement of expenditures incurred by the Project Promoter on various approved budget heads, after these have been duly verified by the independent monitoring agency.

A baseline survey to determine the entry level situation and end-of-project survey will also be conducted by the independent monitoring agency to assess the impact of the project intervention. It will further furnish monthly, quarterly and annual progress reports to DAC and the State and operationalize Information Communication Technology (ICT) enabled Management Information System (MIS) up to grass root level and if need be develop and host its own website.

Scheme Components and Pattern of Assistance

The Scheme will cover all project components in all agriculture and allied sector areas. All farmer related services (i.e. not inputs or hardware) and other interventions leading to productivity enhancement will be supported fully. There will be a 50% limit on items (like farm machinery and irrigation infrastructure) which are to be provided on subsidy to farmers. However, there will be flexibility as far as the community based projects are concerned. For instance, 100 per cent subsidy can obtained by FPOs for developing warehousing infrastructure under Rural Godown Scheme.

The scheme will be demand and need based in each segment. Technology will play an important role in different interventions. The interventions envisaged for achieving desired goals would be varied and regionally differentiated with focus on potential vegetable crops to be developed in clusters by deploying modern and hi-tech interventions and duly ensuring backward and forward linkages.

Performance based overhead costs will be given to the companies for meeting administrative expenses for executing the projects. The companies would have to submit Results Framework Document (RFD) for getting the project approved. If the company's performance if excellent, it can be entitled to maximum overheads of 8 per cent, similarly, if it is average, it would be entitled to overheads of 5 per cent. If the company's performance is poor, it would be only entitled to overheads of 2 per cent.

The release of funds would be done in a phased manner as per the approved project proposal. The entire project would be divided into five phases with a specific financial allocation for each phase. Amount pertaining each phase would be released during the beginning of each phase. For availing funds of the subsequent phase, the company would have to submit a detailed utilization certificate from the company auditor and interim project report of that phase.

Auto Regressive Moving Average (ARMA) Models

These are class of models widely used these days to forecast complex data series. It basically consists of two parts an ***Auto Regressive*** part denoted as AR and a ***Moving Average*** part, MA. Mathematically, AR is captured by $P_t = b_1P_{t-1}$ and the MA by $P_t = c_1e_{t-1}$, where P_t is the series under study, e_t is the error term, calculated as $P_t - E_t$, and E_t, is the ARMA estimated value of the series, P_t.. b_1 and c_1 are the parameters to be estimated. When the model is fitted to empirical data an ARIMA, which is a combination of AR and MA is fitted for purposes of parsimony. The popularity of ARIMA model is due to its statistical properties as well as use of well-known Box-Jenkins methodology in the model building process.

a) The model is checked for stationary, a condition of absence of a trend and if a trend is observed it is removed by differencing the series appropriately till the trend is removed. The order of the auto regressive and moving average processes is critical for the success of the model building process. The order is determined by computing the auto correlation and partial auto correlation function of the stationary series. The tentatively identified model is then specified and the parameters are estimated. The errors of the fitted model are checked for their randomness and if found adequate the model is used for forecasting the series. The forecasted series is again checked for their forecasting accuracy using measures like Root Mean Square Error (RMSE), Mean Absolute Percent Error (MAPE), etc. The stages of fitting an ARIMA model includes model identification, diagrammatic depiction of the GARCH forecasts, actual forecasting, validating the model, neural networks and modelling volatility (Engle 1982 and Bollerslev 1986).

b) **Neural network** is essentially a machine learning technique. Neural network architectures can be trained to forecast the future values of the dependent variables, after it studies past behaviour of the series. It is a multi-layer feed-forward neural network approach consists of an input layer, one or several hidden layers and an output layer. Another approach is known as the partially recurrent neural network that can learn sequences as time evolves and responds to the same input pattern differently at different times, depending on the previous input patterns. However, an additional dampened feedback, that possesses the characteristics of a dynamic memory, will improve the performance of forecasts.

C) Artificial Neural Networks (ANN): These are composed of multiple nodes, which imitate biological neurons of human brain. The neurons are connected by links and they interact with each other. The nodes can take input data and perform simple operations on the data. The result of these operations is passed to other neurons. The output at each node is called its activation or node value.

1) Each link is associated with weight. ANNs are capable of learning, which takes place by altering weight values. The fig. ANN-1. shows a simple ANN.

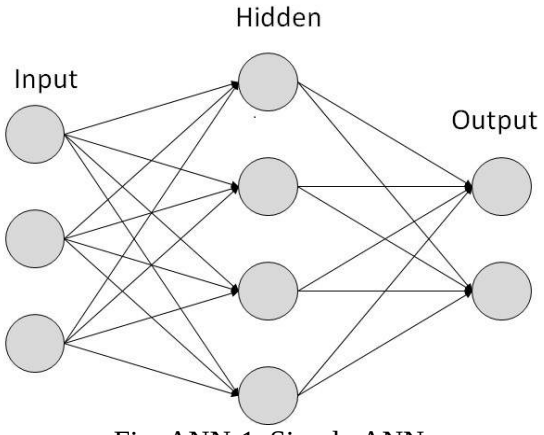

Fig. ANN-1. Simple ANN

2) Every linkage calculation in an Artificial Neural Network (ANN) is similar. In general, a sigmoid relationship is assumed between the input variables and the activation rate of hidden nodes or between the hidden nodes and the activation rate of output nodes.

3) For each observation, ANN does multiple re-calibrations for each linkage weights. Hence, the time taken by the algorithm rises much faster than other traditional algorithm for the same increase in data volume. ANN technique is an iterative process as shown in Fig. ANN-2.

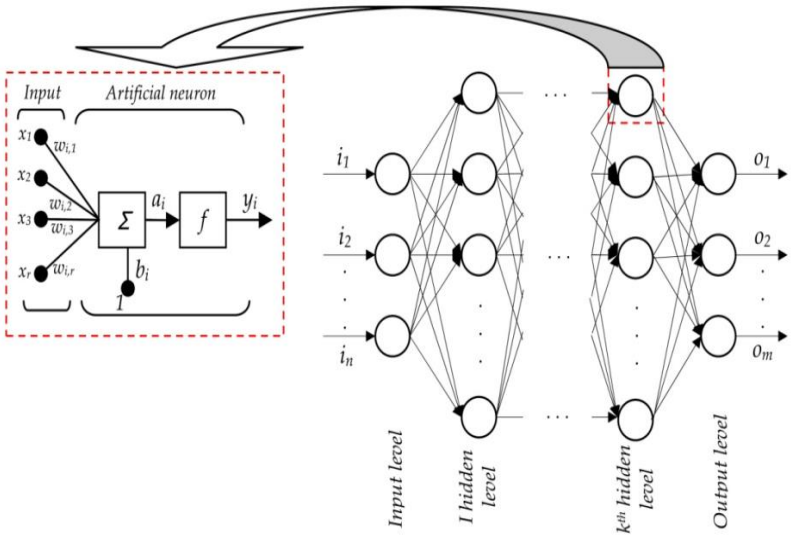

Fig. ANN-2. ANN Process

4) ANN is generally used in cases where the data in past is repeated almost exactly in same way and useful when used as the learning model for commodity price projection (Zhang et. al. 1998)

d) Volatility is a serious problem affecting agricultural commodities as it introduces uncertainty into the system. A number of models have been developed in empirical finance literature to investigate volatility across different regions and countries. The most commonly applied models to estimate exchange rate volatility are the autoregressive conditional heteroscedastic (ARCH) model introduced by Engle (1982) and the generalized (GARCH) models developed independently by Bollerslev (1986).

Details of wholesale, Rural Primary and Regulated Markets in Different States/UTs

(As on 31.03.2015) and number of markets per lakh gross cropped area

States/UTs	Number of Markets				Regulated Markets			
	Whole-sale	Rural Primary Retail	Total	Total markets per lakh gross cropped area	Principal markets	Sub Market Yards	Total	Regulated markets per lakh gross cropped area
Andhra Pradesh	190	157	347	4.3	190	157	347	4.3
Bihar	325	1469	1794	23.7	-	-	-	-
Chhattisgarh	2	1132	1134	19.9	69	118	187	3.3
Goa	4	24	28	17.7	1	7	8	5.1
Gujarat	205	129	334	2.7	213	187	400	3.2
Haryana	281	195	476	7.4	107	174	281	4.3
Himachal Pradesh	42	35	77	8.2	10	44	54	5.7
Jammu & Kashmir	0	8	8	0.7	11	0	11	1.0
Jharkhand	201	602	803	48.0	28	173	201	12.0
Karnataka	315	730	1243	10.1	157	356	513	4.2
Kerala	348	1014	1362	52.1	-	-	-	-
Madhya Pradesh	0	0	0	0.0	254	284	538	2.2
Maharashtra	881	3500	4381	18.8	305	603	908	3.9
Odisha	398	1150	1548	30.0	54	382	436	8.4
Punjab	424	1390	1814	23.1	150	274	424	5.4
Rajashthan	446	312	758	2.9	134	312	446	1.7
Tamil Nadu	0	0	0	0.0	277	6	283	4.8
Telangana	150	110	260	4.1	150	110	260	4.1
Uttar Pradesh	584	3464	4048	15.6	250	365	615	2.4
Uttarakhand	36	30	66	6.0	26	32	58	5.3
West Bengal	279	3250	3529	36.7	20	464	484	5.0
N.E States								
Assam	405	735	1140	27.8	20	206	226	5.5
Arunachal Pradesh	5	66	71	24.0	0	0	0	0.0
Manipur	24	95	119	31.6	-	-	-	-
Meghalaya	35	85	120	35.0	2	0	2	0.6
Mizoram	7	218	225	197.6	-	-	-	-
Nagaland	19	174	193	38.7	18	0	18	3.6
Sikkim	7	12	19	12.9	-	-	-	-
Tripura	84	470	554	-	21	0	21	-
Union Territories								
A & N Islands	0	28	28	115.3	-	-	-	-
Chandigarh	1	0	1	51.2	1	0	1	51.2
D & N Haveli	0	0	0	0.0	-	-	-	-
Daman & Diu	0	0	0	0.0	-	-	-	-
Delhi	30	0	30	84.9	7	8	15	42.5
Lakshadweep	0	0	0	0.0	-	-	-	-
Pudducherry	4	5	9	35.6	4	5	9	35.6

Note: - Based on Information received from various States/UTs Authorities

Marketed Surplus Ratio (MSR) and Production Growth of Important Agricultural Commodities in India

	Production growth (2004-05 to 2013-14)	Marketed Surplus Ratio		
		1999-00	2004-05	2014-15
I. Foodgrains : Cereals				
Rice	2.0	60.32	71.37	84.35
Wheat	4.3	54.48	63.33	73.78
Maize	6.4	62.79	76.22	88.06
Jowar	-3.8	46.83	53.44	66.64
Bajra	1.6	65.22	69.39	68.42
Ragi	-2.8	41.15	57.74	47.60
II. Pulses				
Arhar	1.1	62.93	79.52	88.21
Gram	6.5	65.63	93.76	91.10
Urad	4.4	80.91	85.76	85.56
Moong	4.6	70.13	76.79	90.65
Lentil	1.7	59.87	85.86	94.38
III. Oilseeds				
Groundnut	0.5	63.34	88.75	91.63
Rapeseed & Mustard	-1.1	71.57	89.66	90.94
Soybean	8.0	94.95	94.99	71.00
Sunflower	-12.3	99.30	98.32	89.14
Sesamum	1.3	84.45	87.38	93.80
Safflower	-26.5	86.80	91.34	100.0-
IV. Other Commercial Crops				
Sugarcane	3.7	82.5	98.23	18.94
Cotton	10.3	94.58	94.94	98.79
Jute	1.0	97.5	90.72	98.59
V. Vegetables				
Onion	12.9	-	82.91	91.29
Potato	10.6	45.90	85.00	71.51

Source: DACNET & Agricultural Statistics at a Glance

There is a steady increase in the ratio between the output-marketed to output-produced over the years. However, the marketed surplus may not be finding optimal value and is monetised at nearby markets which may not have sufficient demand from its consumer catchment.

Production & Market Arrivals of Major Foodgrains, Oilseeds & Vegetables

Commodity	Production during 2016-17 (in tons)	Agmarknet Arrivals 01/07/2016-30/06/2017 (in tons)	Agmarknet Mandi Arrivals wrt Production (%)
PULSES			
TUR	45,98,800	18,98,077	41
URAD	29,26,400	9,60,298	33
MOONG	20,69,600	8,55,729	41
CHANA	90,75,100	19,69,567	22
Sub Total	186,69,900	56,83,671	30
CEREALS			
PADDY	10,91,50,000	3,88,28,247	36
WHEAT	9,74,40,000	2,98,48,947	31
MAIZE	2,61,40,000	51,64,929	20
BAJRA	98,55,700	12,81,247	13
JOWAR	47,40,300	3,84,457	8
RAGI	14,30,300	1,28,832	9
BARLEY	25,80,000	3,72,266	14
Sub Total	25,13,36,300	7,60,08,925	30
MAJOR OILSEEDS			
GROUNDNUT	76,50,200	12,11,256	16
MUSTARD	79,76,600	25,47,868	32
SOYBEAN	1,40,08,000	54,99,918	39
SUNFLOWER	2,32,300	54,142	23
SAFFLOWER	63,800	3,014	5
NIGER	85,400	7,167	8
Sub Total	3,00,16,300	93,23,365	31
MAJOR VEGETABLES			
ONION	216,00,000	129,03,835	60
POTATO	466,00,000	117,94,079	25
TOMATO	197,00,000	36,52,258	19
Sub Total	879,00,000	283,50,172	32

Source: Production of Major Food grains *& Oilseeds as per DES 3rd AE 2016-17 and Production of Major Vegetables as per DAC*&FW *Hort Stat Division 2nd AE 2016-17*